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“ By mutual confidence and mutual aid
Great deeds are done and great discoveries made.”
POPE'S ‘*Homer*.’

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‘I said that ‘all the years invent;
Each month is various to present
The world with some development.’”

TENNYSON'S ‘*Two Voices*.’

“Not only does the marvellous structure of each organised being involve the whole past history of the earth, but such apparently unimportant facts as the presence of certain types of plants or animals in one island rather than in another, are now shown to be dependent on the long series of past geological changes—on those marvellous astronomical revolutions which cause a periodic variation of terrestrial climates, and on the endlessly varied actions and reactions of organised beings on each other. . . . We are thus encouraged to study more completely every detail and every anomaly in the distribution of living things, in firm conviction that by so doing we shall obtain a fuller and clearer insight into the course of nature.”

ALFRED RUSSEL WALLACE, in ‘*Island Life*.’

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VARIETY OF MELANIPPE HASTATA.



MELANIPPE HASTATA, var.

THE above very pretty variety of *Melanippe hastata* was taken in June, 1880, by Mr. William Prest, of York, while he was collecting in Edlington Wood, near Doncaster. At the same time Mr. Prest captured a long series of the normal type of this insect, but no other variety.

JOHN T. CARRINGTON.

NOTES ON THE LEPIDOPTERA OF NATAL.

BY WILLIAM D. GOOCH, C.E.

(Continued from vol. xiii., p. 276.)

THE larvæ of the *Acreïdæ* in Natal seem to have a tendency to gregarious habits, especially *Cynthia* and *Petræa*. *Violarum* also generally occurs numerously on any food-plant which is frequented by it. The young of *Cynthia* are common on a woolly-leaved *Lamium*, of which they eat away the under side of the leaf, curling it over, and enveloping it with silk threads, in which the exuviae and cast-skins get entangled. I have counted over eighty specimens in one brood.

The larvæ of *Petræa* do not, so far as I have observed, spin a common web, but they are very abundant. One shrub of the food-plant was year after year attacked by them in hundreds; and in the pupa state, I picked one branch with over twenty of the rather brilliantly marked pupæ attached to it. They seemed to have a peculiar liking for this one shrub, the only one out of several of the same size and species in the same spot and aspect, and apparently similar condition, which the larvæ ever attacked. Every entomologist must have had an experience of this character, and possibly has found as little explanation for it as I have.

Lycia is found on a sort of "flowering grass," which is a ground creeper in damp places; it is not very gregarious, but occurs sparsely over the masses of the food-plant on the ground. *Natalica* and *Petræa* feed on a succulent creeper, which is a favourite also with *Zetes* and *Hypatia*. The larvæ generally are prettily but not conspicuously coloured, and the pupæ marked with black or red lozenges and angles. Some of the male imagines of the *Acræidæ* are furnished with horny appendages below the abdomen, of which I could never ascertain the use. I have not heard whether this has been noticed generally.

NYPHALIDÆ.

Nymphalidæ both in number and display is very well represented in its many branches, and a South African collection gives a very fair facies of this important and popular family. The drawers of my cabinet containing them were those gazed upon with most admiration by my non-entomological friends.

The widely-spread insect *Atella Phalanta* is very abundant. It hardly varies appreciably from the Indian form in the imago, but the larva and pupa are very different in Natal from Horsfield and Moore's description of the Indian types. The pupa, especially ornamented with coral-red spines and marks and gilt spots, &c., is as beautiful as any I have ever seen, quite eclipsing the glittering *Danaidæ* both in delicacy and brilliancy of colour and harmony of form. My first discovery of the larva of this insect was by noticing a female egg-depositing. I watched her, marked the sprays, found the eggs, and visited them from time to time till the larva emerged, and so on till their pupa stage was reached; meanwhile—having obtained a clue to the food-plant, which much

resembles our hazel—I soon found other larvæ, and bred a good series. At some periods of the year the imago is much darker than at others, following the law already set down concerning some *Anthocarinæ*. The size of this insect varies very much, and to this circumstance I trace the apparent rarity of an allied insect *Lachnoptera Ayresii*. This was first taken by Mr. Bertie Ayres, of Pine Town, and is allied to a West African form. I subsequently captured both male and female. In each case I took them on the wing, and believed them to be, as I struck at them, only large specimens of *A. Phalanta*. Their habits are precisely similar; I have no doubt that if *Atella* were carefully hunted the pursuit would yield a series of *Lachnoptera Ayresii*. The male differs from the female by having a lead-coloured patch on each of the hind wings. The female has handsomer and richer colouring than *A. Phalanta*, and the markings in black festoons are very elegant.

That most universal and at the same time beautiful insect, the “painted lady,” is found as freely in Natal as elsewhere. It occurs throughout the year, and the brooding seems to be continuous. The larva, which differs very slightly in its markings in the male and female forms, feeds on a “common weed,” apparently of the *Urticaceæ*. The insect has sometimes a strong roseate shot over the whole surface of its wings, not interfering with the ordinary markings, which makes it very beautiful.

Allied to the preceding and to our well-known English “admiral” is a very handsome and somewhat rare butterfly, with brilliantly coloured upper-wings, red, white, and black, and with a deep subtly coloured underwing of most marvellous richness and intricacy of pattern. This is *Pyrameis Hippomene*; it is present, I believe, in two varieties, is a somewhat solitary wood-haunting insect, and is difficult to meet with, but is constant in its special and favourite spots; I do not know anything of its transformations. In common with many of the *Nymphalidæ*, the male and female differ in the tails on the hind wings, but not to the same extent as is elsewhere observable.

The conspicuous and at the same time interesting genus *Diadema* is fairly represented in Natal; the mimetic tendencies of the genus are well exemplified in each insect; *D. Misippus*, with its brilliant male and ochreous female mimicking *Danaïs Chrysippus*; *D. Anthedon*, with its attendants, *Varia*, *Mima* and *Dubia*,

which seem, although so diverse in colouring, to be only mimetic varieties of the first, aping *Papilio Leonidas* or *Danais Echeria*. Of *D. Misippus* I have bred several specimens, the larva being a spined one, black throughout, and with two longish and decided horns on the head; each segment is much constricted. The pupa is short and rounded, and highly decorated with grey striæ and blotchings, no doubt as a protection, being very like the bark of stems, &c, to which it is attached. All those I reared were males, so that I cannot tell whether there is a sexual variation in the larvæ. They feed on the leaves and flowers of a composite plant. The insect in its larval state, as in the case of *A. Phalanta*, presents great variation from that figured and described as the Indian one by Horsfield and Moore. The handsome and somewhat rarer *D. Anthedon* I reared from some larvæ I collected on a true nettle growing by water. Although larger, they are very similar to those of *D. Misippus*, but had white rings round the body on each segment. The spines were long, horny, and divaricating, but not urticating; the horns on the head were also present. Although I made special hunts on the food-plant for the larvæ after I had found the first two or three, with the hope of rearing a good series, in order to set at rest if possible the relations between *Anthedon*, *Varia*, and *Mima*, I was unsuccessful in getting more than one poor "beastie," and that was delicate and died. The haunts of the imago always showed me patches of the nettle food-plant growing in the damp, and *Mima* and *Anthedon* were present in about equal abundance, so that I hope, by hunting the nettle patches, some Natal resident will manage to work out the problem I had myself wished to do, and probably breed a series of both these insects from *one brood* of eggs.

Perhaps the most special feature of Natal Nymphalids is the development of the genus *Junonia*. *J. Anacardii* (peculiar to Natal), the "mother-of-pearl butterfly," is the largest and most brilliant; it is a lovely object floating lazily in mid-air in high sunlight, and well deserves its colonial name. The falcation of the wing is very marked, and varies considerably, as does also the size of the insect and the purity of its colouring, which is occasionally so suffused with brownish black as to present the appearance of a new species. It is a wood-haunter, and is not at all uncommon. The capture of two or three of these butterflies is one of the first features of moment in a collector's visit to Natal,

for being conspicuous, they are tempting; being just out of reach, they are exasperating; and being very beautiful and large, they are gratifying when caught.

The larva of this conspicuous insect is, so far, unknown, but from its large size it ought not to remain so long. Judging from *J. Natalica* and *Ænone*, it should be spined and horned, and of a sombre colour, probably not unlike one of the spined *Saturnia* larvæ. I never, by watching the imago, got any clue to the food-plant.

The other species of this genus, *Junonia*, may be subdivided into several groups.

The first group is composed of open country varieties, and as developed in Natal, presents such remarkable intermediate forms between several of its members—*e.g.*, between *Amestris* and *Octavia*, *Archesia* and *Pelargis*, *Archesia* and *Natalica*—that it will be a very pretty problem for the field naturalist to solve their relations, and one which the cabinet entomologist finds himself quite at a loss to deal with. As the perfect insects are all abundant, the larvæ should not be difficult to obtain and rear; that of *J. Amestris* has already been reared by Lieut. H. C. Harford, but no notes on variation were made.

The next group includes *J. Ænone*, a grass butterfly, *J. Clelia*, and *J. Orithya*, which almost appears to be a suffused variety of *Clelia*. The latter insect lives among low scrub and bushes on the coast lands only, whilst the two former are found also on the high grass-lands away from the coast. The transformations of both *Ænone* and *Clelia* are known; I reared several of *Clelia*, and found distinct sexual variation in the caterpillar markings, but to a very modified extent, consisting in the presence of a grey lateral thin line or stripe, below the insertion of the lateral spines.

J. Ceryne is a very variable butterfly; in its form it much resembles *J. Anacardii*, but it is a low flyer, flitting on low bushes or dusty roads. Its variations of colour, I think, are generally traceable to darker or ochreous suffusion obliterating the ordinary markings. It is common in the winter on the coast.

J. Cloantha, a bright butterfly with black festoons and markings, which have a blue shot in certain lights, presenting a very handsome contrast to the ground colour of red ochreous, is

very common on the grass-lands up-country, and is specially a winter or late autumn butterfly. In fact, the whole of the *Junoniæ* are more strongly present in late autumn and winter than in the summer.

The typical Nymphalid is sufficiently developed in Natal in *Charaxes* and *Nymphalis* to brighten up a cabinet and heighten a collector's enterprise. The species which fell to my net in two seasons were *C. Ethalion*, *Brutus*, *Cithæron*, *Pelias*, *Candiope*; *N. Jahlusa*, *Zoolina*, and *Neanthes*. These, without exception, vary, in the tails, between male and female. They are all to be caught feeding on mimosa gum or sap as it exudes from the stem in the hot sunlight, sometimes at distances sufficiently away from the ground to make it a matter of aggravation to the pursuer that his game is quite content, despite all his challenges with bits of paper, showers of sand, &c., to stop and sip the nectar, and pay no attention to the mortal below.

They stick most pertinaciously to these exudations, and sometimes require almost to be "poked" off. But when they do move, it is so suddenly, that very often the net is quite behind, and the opportunity is lost. To increase the difficulty of capture, this exudation is most specially delightful to them when it is from the bark of a rough and very thorny mimosa, which is perfect ruin to nets and temper. However, experience and patience, as in everything else, does it, and by a little attention and several trials the insects can be taken with certainty, as they are very bold, and return continually to the same spot, however often they may be disturbed.

The most remarkable dissimilarity between the sexes, which is not confined to the tails, is the case of *C. Ethalion*, the male being black and smaller than the female, which is black, with white bars and spots and purple blue marks on the upper sides of the wings, though the under sides are nearly identical. The under sides of all the *Charaxes* are handsome, especially *Brutus* and *Pelias*, which are silver veined and very brilliant and rich. *C. Jahlusa* also has silver marks, but in dots and splotches, like our English Fritillaries. *Candiope* is a very handsome red-brown butterfly, with bright green veins, &c. *Pelias*, which is very local, is also red-brown, but without green veins. *Candiope* haunts bush paths by the coast; *Pelias*, mimosa scrub on hill-tops inland. *Ethalion* loves scattered bush near grass-land. *Brutus*,

like *Candiope*, is a bush lover; and so is *Cithæron* generally, although specially affecting orange groves. *Jahlusa*, with its silver-spotted under side, is not found freely coastwards, but in kloofs and bushes up-country. *Zoolina* and *Neanthes*, which, except for the fact that *Zoolina* is white and *Neanthes* ochreous, are identical in markings, habits, and sexual differences, and appear to be a variety of one another, are coast butterflies, haunting low mimosa trees in glades, or waste scrub, or rows of "bois noir," a mimosa that has been introduced into Natal, and is often planted on sugar estates as a margin to roads.

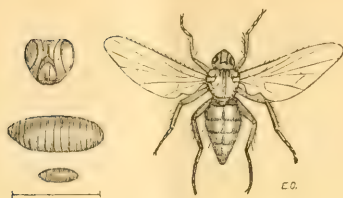
The metamorphoses of these insects are not at all well known. I reared *Cithæron* and *Brutus* from the larvæ, but did not obtain any others. The larvæ in these cases were somewhat slug-formed, with very pronounced heads, green with a rough skin, and with delicate blue markings and edgings. They differed sexually in both instances, and the head had four or more short irregular processes or horns, edged and tipped with colour. Of *Brutus* I only bred a few, but of *Cithæron* many. The sexual difference of the latter was that the females had a large dorsal sub-cordate cream mark which was wanting, or only shown by a dot, in the males, and the colour was more vivid in the edgings to the frontal horns. *Brutus* had pale, oblique, lateral lines, in the reverse direction to those on the sphingiform caterpillars.

The next genus, *Pseudacræa*, has already been referred to several times; it is a small family, consisting of only *P. Tarquinia* and *P. Boisduvalii*. I believe another, *P. imitator*, is added in Mr. Trimen's list, but I have not seen it, and am inclined to think that as *P. Boisduvalii* is imitative in both its sexual forms of *Acraea Acara*, so the two forms, *P. Tarquinia* and *imitator*, are imitative of sexual differences of *Acraea Aganice*, and are sexual vars. of the same insect. It lives apparently on sufferance by its imitative powers of the odious *Acraeidae*. When present on the wing, I have always found it in company with its patron. I am unaware of its transformations, but should not be surprised to find the larval state also an imitative one of the *Acraea* family.

(To be continued.)

THE MANGOLD-FLY.

BY EDWARD A. FITCH.



CHORTOPHILA BETÆ.

It is not long since one of the arguments advanced in favour of mangold culture over that of turnips or swedes was the immunity of the former root-crop from insect attack; and it is but few years since our agricultural text-books gave this crop as altogether free from these pests. The experience of the last two or three years has produced quite an opposite conviction. Mildew or louse (*Rhopalosiphum dianthi*), the nigger or turnip-sawfly (*Athalia spinarum*), have hardly put in an appearance, and the "fly" (*Phyllotreta undulata*) has not been specially troublesome amongst our turnips and swedes; while, on the contrary, the young mangolds have everywhere suffered severely from wireworm (*Agriotes lineatus*, *Athoïs niger*) and *Tipula* grubs below the surface, and from caterpillars just above (*Agrotis segetum*, *A. exclamationis*). Amongst the Coleoptera *Silpha opaca*, *S. levigata*, *S. atrata*, *Atomaria linearis* (both here and on the Continent, especially so in 1875 and 1876), *Tanymechus palliatus*, *Cleonus sulcirostris*, *Gastrophysa polygoni*, *Cassida nebulosa*, and one of the *Halticidæ*, are all occasional destructives. The soft, pale brown, tuberculate, six-legged, antenniferous larva, and the pretty beetle, with its dark steel-blue elytra and red thorax, of *Gastrophysa polygoni*, have been destructive to the mangold leaves this year in several localities, more especially in the West of England. *Tanymechus palliatus* and *Cleonus* (*Bothynoderes*) *punctiventris* have been particularly destructive in Russia.

This year we have one of those inexplicable spasmodic attacks, of some species not generally noxious, amongst the mangold crop throughout the kingdom. It has been more especially injurious in the North of England. The mangold leaves have been

blistered, and eventually destroyed, through the small larva of a dipterous fly feeding on the pulp between their cuticle. Whole fields have been completely scorched up, as it were, from their attack.

The mangold-fly—*Anthomyia (Chortophila) betæ*—was first brought into notice by Curtis. He described the male in the part of the 'Journal of the Royal Agricultural Society' published in December, 1847, from specimens received from Mr. F. J. Graham, of Cranford, who related its economy as observed in Surrey. Until this year I am aware of but one other recorded occurrence—at Castlewellan, Ireland. On the Continent its injurious effects have been repeatedly observed in Germany (Scholtz, Nördlinger, Taschenberg, Fichtner, and Farsky); also in Sweden by Holmgren.

In Mr. H. J. Little's report on the "Cumberland and Westmoreland Farm-prize Competition, 1880," in the just published part of R. Agric. Soc. Eng. Journal, we now read:—"Part of the peat-land was planted with mangolds, but, like all the crops of that root in this country, they were very indifferent, having suffered from the maggot which seems to infest the North of England. This creature settles in the leaves, eats out their ribs, and entirely prevents growth. We did not find a piece free from its ravages in the two counties" (l. c. xvi. 549). This is on the fen-like soil of Mr. Donald's Sanden House Farm, near the shore of the Solway Firth. In writing of Mr. Kitchen's heavy land, upland, Farm, near Calthwaite, in central Cumberland, which is over 500 feet above sea-level, Mr. Little again says:—"A small quantity of long red mangolds are taken, and, like all the rest in this county, they were affected with the grub in the leaf, before alluded to." In 1880 there were 1624 acres of mangold grown in these two counties, and this high authority says *all* were infested.

Many of the short crop reports in our agricultural and local papers have referred to this new pest; and I have heard of it from correspondents in Cheshire, Yorks, Notts, Norfolk, Suffolk, Essex, Herts, and Salop. The following practical references are from the pages of the 'Chamber of Agriculture Journal.' Mr. W. T. Carrington, of Croxden Abbey, Uttoxeter (North Stafford), says, "Mangolds are poor and irregular generally; the leaves are now (July 12th) much pestered by a maggot." J., writing from North Shropshire, in the same number, says, "Mangolds

mostly destroyed by grub." From Cheshire a correspondent, writing on August 7th, reports that "Mangold is again suffering from the maggot in the leaf." Mr. T. Duckham, M.P., says of Herefordshire, "Mangold injured seriously by white grub in the leaf." The most entomological report hails from North Wilts. In the number for July 19th, W. P. J. A. writes, "Early sown mangolds have grown well, but are much injured by the maggot in the leaves, recently mentioned by your correspondents; nearly every plant is attacked, and some of the leaves appear scorched and shrivelled. I see several other large-leaved plants are similarly affected, as fat-hen, burdock, and docks. The latter plant has been liable to such attacks generally; however, I have noticed dock leaves affected in the same manner for thirty-five to forty years. Last year parsnips and celery were destroyed by this pest." This is enough to show the general distribution of the mangold-fly, and the noticeable injury it has everywhere caused. Now to the destructive itself.

The eggs are laid in little scattered heaps on the under side of the mangold leaves, between the ribs, generally about the end of May or early in June, and again in July or August. These are



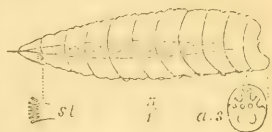
elliptical in form and snowy white in colour, but with a strong glass they show a honeycomb-like, hexagonal pattern, as seen in the figure, which is copied from Farsky. As is very general in *Diptera* these eggs are attached together by means of a gummy substance, more often longitudinally,

but not always; this viscous nature also attaches them to the leaf. Farsky found from four to eleven eggs in a batch, and as many as four batches on a leaf; but this is probably exceptional. Each egg is from $\frac{1}{2}$ to $\frac{3}{4}$ of a millimetre long, by about $\frac{1}{3}$ mm. broad.

As soon as hatched the young maggot bores through the lower cuticle of the leaf, and commences feeding on the pulp. It now feeds very energetically, and grows accordingly. The whole parenchyma of the leaf is often completely eaten, nothing but the thick midrib stopping the course of the larva. The leaf then presents a very bladdery or blotched and bleached appearance; it speedily withers up and dies, but does not drop off. The larvæ sometimes are found singly, but more often two or three feed in the same blotch, and where there were as many as eleven eggs

laid together we should expect to find eleven larvæ in a leaf; from what we know of the gastronomic powers of a single larva, where this happens the struggle for existence must eventually be rather severe. Farsky gives the result of an experiment on the extent of leaf blotched by eleven larvæ transferred from affected leaves to a fresh one. In six hours the blotch measured twelve square centimetres, and in twenty-four hours fifty-eight square centimetres, but as in all insects the amount of food consumed in a given time varies greatly according to many circumstances.

The full-fed larva is about one third of an inch (7—9 mm.) long. It is apod, conico-cylindrical in shape, wide at its anal extremity, and tapering gradually from the 7th segment to the head; this carries two black retractile hooks. Westwood says “the mouth of the larvæ of the genus *Pegomyia* is furnished with a corneous instrument in the shape of S, which moves round a small fixed point, enabling them to scrape up the soft parenchyma of the leaf.” In colour it is pale yellowish white, showing greener towards its thickened extremity from the intestines showing through. This led Mr. Graham to describe the larva as greenish; its frass is dark green. A pair of stigmata are placed just before the second segment; Farsky shows them greatly magnified in his figure, which is here copied, and says they resemble a seven-rayed fan (magnified, *st*). He also figures and minutely describes the truncate terminal segment (magnified, *a.s*); on the dorsal



sloping part are four twin, fleshy appendages; in the centre below these are two papillæ, with two more spiracles; there are two very inconspicuous protuberances on the ventral surface. It is therefore an amphipneustic larva, according to Haliday's classification. When full-fed the larva generally eats its way out of the leaf, and pupates in the ground, but occasionally this takes place within the leaf, as did the specimens described by Curtis. Mr. F. Norgate says he finds the pupæ about three inches below the surface, and again, “I cannot find a single pupa in the leaves, nor have I induced a larva to pupate in a leaf, but believe this always takes place underground.” It might be thought that Curtis refers to a distinct species, but Farsky specially tells us that from his experimental leaf some pupated underground, while others did

so in the leaf. I believe this is common with many leaf-mining Diptera.

The hard, coarctate pupa is from 5 to 6 mm. long, and of the shape usual with the typical *Muscidæ*. It is oval, slightly wrinkled, segmental divisions very indistinct; reddish brown in colour, slightly darker towards the head (see figure, heading article).

C. betæ hibernates as a pupa, though when bred the imagos are often produced in the late autumn. Farsky tells us that his second brood pupated about the 20th and 21st of October, while the imagos appeared at intervals from 10 to 105 days (4th February). Hence we find that barren specimens may be produced in the autumn, but pupal hibernation is natural. The flies are produced from March to May; the egg state lasts from a week to ten days; as larvæ they live about a month, and the first brood remain in pupæ from ten days to a fortnight. There are normally two broods in the year, but frequently three or even more, where conditions meteorological and otherwise are favourable. In 1854 Nördlinger found young larvæ as late as October 1st. From Sparham, Norfolk, Mr. Frank Norgate reports the larvæ common in two fields on June 20th. Mr. Nelson's twenty acres were "set back about three weeks by the attack, and the headlands suffer least." On July 1st he dug twelve pupæ, which emerged from 7th to 13th. On August 1st he reports, "saw plenty of ova on under surface of mangold leaves. Their larvæ are now more numerous than ever, and the whole field looks brown with dry and blistered leaves;" and again, on September 29th, "Mr. G. Forby, of Sparham, tells me his mangold are now fresh 'blown' by flies, and are set back by them." This appears to point distinctly to three broods in Norfolk this year, and the Cheshire correspondent already quoted reports a second attack, or brood, in August. Mr. Graham's specimens, quoted by Curtis, were larvæ on 26th June, and the imagos appeared from July 17th to 20th. The great attack this year throughout the country was in the first fortnight of July. Mr. Inchbald says the fields around Bridlington were attacked in July and August. Mr. Norgate's copious notes were contributed for Miss Ormerod's 'Injurious Insect Report,' to whom I am indebted for them, as well as the drawing at the head of this article. In this year's 'Report' the mangold-fly is also reported from Slogarie, Kirkcudbright, by Mr. Service; from Churbrook, Cheshire, by Mr.

Fitton; from Church Stretton, Shropshire, by Mr. S. Harley Kough; from Ballinacourt, Tipperary, by Mr. Sym Scott; and from Dromore Castle, Kenmare, Kerry, by Dr. R. J. Mahoney.

The mangold-fly belongs to that immense Dipterous family, the *Muscidæ*; Schiner describes 359 genera, and there are many others occurring in Europe. It is included in the subfamily *Anthomyiidae*. This division includes a whole host of species, so closely allied that they are particularly difficult to separate. Their economy is very variable, the larvæ feeding on vegetable or animal matter, dead or living. Of the phytophagous species some feed in bulbs, roots, or stems, as the well-known onion flies (*A. platura*, Meig.; *A. antiqua*, Meig. = *ceparum*, Westw.; *A. furcata*, Bouché); the too common radish fly (*A. floralis*, Fallen); and the cabbage flies (*A. radicum*, L.; *A. ruficeps*, Meig.; the compound *A. brassicæ*, &c). One species is very destructive to lettuce seed (*A. lactucæ*, Bouché). Of leaf blottchers there are several, mostly imperfectly known and with their synonymy greatly involved. Field naturalists and systematists do not always work together. These leaf-feeders generally have yellow abdomens, and are included in Macquart's genus *Pegomyia*, to which his *Chortophila* is very closely allied, but this includes the dark-bodied species. The common dock leaf miner is *P. mitis*, Meig., Macq. = *rumicis*, Desv. *P. bicolor*, Wied., similarly blotches other species of *Rumex*. *P. hyoscyami*, Panz., Macq., affects the henbane, and our species of goosefoot (*Chenopodium*) and orache (*Atriplex*) are blotched by a species doubtfully distinct from it; Goureau called this *P. atriplicis*, and Rondani *P. chenopodii*. This brings us into very close proximity with our mangold species; the botanic genus *Beta* coming between *Chenopodium* and *Atriplex*.

(To be continued.)

NOTES FROM TAYNUILT.

By REGINALD E. SALWEY.

I HAD the opportunity of spending three weeks in Taynuilt, Argyllshire, last June, and have extracted a few notes from my diary of my entomological doings there.

Taynuilt is a scattered village situated about half-way between

Dalmally and Oban, and is now accessible by the extended line of rail between the last-mentioned places. The scenery is most impressive between Dalmally and Taynuilt, which is approached through the wild and gloomy Brander Pass,—

“Where rocks were rudely heaped and rent
As by a spirit turbulent,”

and through which flows the short but very picturesque River Awe, connecting Lochs Awe and Etive, a stream dear to anglers, but which proved singularly unproductive last season; to this fact my brother and many fishermen can testify.

I commenced operations with my net by the margin of the river, on whose farther shore Ben Cruachan stands majestic. Here in a succession of fields I found *Tanagra chærophyllata* and *Emmelesia albulata* very plentiful; and in one limited space *Procris statice* abounded. Farther on, where the ground was uncultivated, *Melanippe tristata* and *M. subtristata* rose in numbers as I pushed through the ferns; and a little promiscuous beating among stunted bushes overhanging the river produced a few other species of Geometræ, viz., *Acidalia fumata*, *Numeria pulveraria*, and *Cidaria corylata*. Owing to the want of variety in foliage the woods round about did not prove very productive; but following the course of the little River Nant, which meets the Awe at Taynuilt,—and is by the way a capital trout stream,—I devoted several dull mornings to beating the copse wood for two miles up stream, and thus made several additions to my list of Geometræ, but none of importance: *Ephyra punctaria*, *Melanippe hastata*, *Cidaria populata*, and some pretty forms of *Boarmia repandata*, intermingled with commoner species, such as *Larentia pectinitaria*, *Lomaspilis marginata*, and *Melanippe ocellata*, were the result of my labours,—an insufficient reward for the invariable arm-ache and occasional drenching with which I returned to the hotel. Just before leaving the locality I discovered a birch wood where *Metrocampa margaritata* abounded, as many as five specimens responding on one occasion to a single blow of the beating-stick. Evening netting procured for me specimens of *Emmelesia affinitata* and *E. blandiata*, *Larentia salicata*, *Miana arcuosa*, and other common species of Geometræ and Noctuæ.

The dearth of butterflies seemed remarkable to me after my southern experience. Of this group *Argynnis Aglaia* proved the most abundant and interesting. On June 18th I came upon

a great number flying along a slope on the moorland, mostly fresh from the chrysalis. The males were remarkable for the intensity of their colours, and the females for their great size and rich brown hues, some suffused almost to blackness. I netted a pretty variety of the male in which the usual markings of the anterior wings are superseded by graceful black lines. A dingy type of *Chortobius Pamphilus* was fairly plentiful everywhere; *Lycæna Alexis* scarce; a few *Argynnis Selene* turned up in open spaces of the woods; and on June 19th I took a couple of *Melitæa Artemis* in a marshy field: they were literally worn to shadows, but I fancy the species would have proved plentiful there at the end of May. A solitary granite boulder jutting out from the interminably heather-clad moorland seemed to be a favourite resting-place for some species. Here in a space of about sixty yards square I secured a few fine and strongly-marked *Satyrus Semele*; also *Zygæna filipendulæ*, some with confluent spots; and in their company two solitary *Z. nubigena*; also *Dasydia obfuscata*, *Larentia cæsiata*, *Anaitis plagiata*. Some tolerably dark *Cidaria russata* sitting close on the rock, but sufficiently wary to fly off at my approach, also occurred here; but owing to the nature of the spot were easier to see than to capture.

Perhaps my most successful effort was sugaring. I had little more than a week of it, as towards the close of my stay the weather turned out something more unpleasant than the proverbially "saft," and night-work was out of the question. However I managed to obtain thirty-five species of Noctuæ by this method of capture, among which my best takes were *Aplecta occulta*, *A. herbida*, *A. tinctoria*, *Hadena rectilinea*, and *Acronycta leporina*. My southern experience made the northern forms of many of the common Noctuæ appear very novel. Notably so was *Hadena pisi*, tinged with grayish blue, and *Aplecta nebulosa* in some instances nearly white and almost without markings. *Xylophasia rurea* var. *combusta*, and black and brown *X. polyodon*, naturally occurred, while *Hadena adusta* proved a nuisance. In consequence of the northern latitude, sugaring in June at Taynuilt necessitated late hours, and my first round was never attempted before half-past ten; but as I found suitable posts at the back of a copse, within five minutes' walk of the hotel, this did not matter.

The locality is too near the sea-level to afford a chance of capturing the mountain butterflies, or such insects as *Noctua sobrina* or *Pachnobia hyperborea*; but I am of opinion that a climb and investigation of Ben Cruachan would prove profitable. This I did not attempt, as I was looking forward to a short visit to Rannoch, where I afterwards obtained *Erebia Cassiope* and *Chortobius Davus* in plenty. Putting aside the natural beauty of the spot, I am inclined to think Taynuilt would prove worthy of something better than the desultory working I was able to give it.

I know of no other accommodation there beyond the hotel, which is commodious and comfortable.

Auburn Villa, Putney, December, 1880.

ENTOMOLOGICAL NOTES, CAPTURES, &c.

VANESSA ANTIOPA.—I am pleased to be able to hand you another instance of the capture of *Vanessa Antiopa*, which I took near Aldershot, on August 20th, 1880, while it was sitting on an oak tree, which I had sugared on the previous night.—F. J. GALSWORTHY; 8, Queen's Gate, Hyde Park, London, S.W.

ON THE GEOGRAPHICAL DISTRIBUTION OF ORGYIA ANTIQUA.—The subject of the geographical distribution of plants and animals is altogether too deep to be touched upon in a small paper, yet there are occasionally matters in connection therewith that present themselves to our notice, and that cannot be explained away with the facility that attends the disposition of many questions of this character. There is no doubt that, apart from the agency of Nature's laws, human assistance, or rather the results of civilisation, have conduced in no small degree to tend to distribute not only plants, but quadrupeds and insects. The Norwegian rat, which has entirely replaced the English rat, is a strong proof of this; and the constant appearance of tropical Coleoptera at docks and similar places bears out the argument. But how are we to account for the almost universal distribution of the wingless-wifed *Orgyia antiqua*, or in fact any of the Lepidoptera whose females are apterous; human agency in this case will not bear consideration, as we have no reason to suppose that its existence here or on the Continent dates from any

particular historic time. Again, it is quite out of the question to imagine that its female was ever, even under the most favourable circumstances, blown across the silver streak; for not only is its ponderous body incapable of such a feat, but it usually deposits its eggs on the exterior of its cocoon, so that it would not therefore present a chance of being caught by the wind. Had the larva been a smooth one, or even had the eggs been a suitable food for any bird, animal, reptile, or fish, a reason might possibly have been traced for distribution in this manner; but the larva is hairy, and perhaps no insect is so little molested as *Orgyia antiqua* in any of its stages. How then has this insect become so widely distributed, whose eggs are deposited on the cocoon of their mother's pupa, and whose larvæ crawl to the nearest food to begin the battle of life. The argument may be put forward that it took place before the present arrangement of the Continent and islands,—in fact when these islands were part and parcel of the rest of Europe; but if this were so, how did it survive the great climatic changes which attended and followed that period. It could not have done so, and the question remains: How are we to account for the great distribution of those Lepidoptera whose females are apterous, and whose larvæ are not molested by other creatures?—E. LOVETT; Croydon.

ODONESTIS POTATORIA, *var.*—The variety in the male of this species of the pale yellow colour of the female, as recorded by Mr. Bowyer, in the December number of the 'Entomologist' (Entom. xiii. 310), is of rather frequent occurrence in Wicken Fen. The great majority, too, of the females I bred from larvæ brought from Wicken last June were of a much paler and duller yellow than in the ordinary type of the species.—GEO. T. PORRITT; Highroyd House, Huddersfield, December 4, 1880.

ODONESTIS POTATORIA, *var.*—As all records of varieties are worth noting, I wish to mention that I bred this summer, from a very small batch of larvæ, a good variety of *Odonestis potatoria*, a female, having a near approach to the colouring of the male, the wings being of a very dark shade, and the general markings resembling the usual decided character of the male insect.—ED. LOVETT; Holly Mount, Croydon, December, 1880.

RARE LEPIDOPTERA AT LIGHT.—While returning from an unprofitable sugaring excursion on the sandhills here, last

September, I took a fair specimen of *Laphygma exigua* from a street-lamp. I find that in this neighbourhood the lamps often repay a visit. Among sundry things I have captured from them, at odd times, I find I have taken *Ennomos alniaria*, *Deiopeia pulchella*, and *Leucania vitellina*—R. HARBOUR; 1, Landport Cottages, Deal, November 24, 1880.

APLECTA OCCULTA NEAR WHITBY.—Towards the end of August my brother and I were fortunate enough to catch two specimens of *Aplecta occulta*, one in very good condition, at Whitby.—C. DASHWOOD SNELL; St. John's College, Oxford, Nov. 18, 1880.

ABRAXAS GROSSULARIATA DOUBLE-BROODED.—In referring to my diary I find the following:—"November 1st, 1874, a friend of mine, Mr. Holden, brought me three pupæ and three larvæ of *Abraxas grossulariata*. He took them from a celery plant, and there were neither gooseberry nor currant bushes in the garden where they occurred. The insects emerged from the pupæ on November 25th, but they were in no way different from the normal type, except a little smaller. The three larvæ died."—W. JOHNSON; 66, Upper Warwick Street, Liverpool, Dec. 8, 1880.

[The late Mr. Chapman, of Glasgow, visited Ailsa Crag some years ago, and found *Abraxas* larvæ feeding in numbers upon *Cotyledon umbilicus*. If we remember rightly they produced the ordinary form of *A. grossulariata*. Of course navelwort is more nearly allied to the *Ribesiaceæ* than is celery.—Ed.]

NOTES FROM RANWORTH FEN.—The last twelve days of August I spent in the neighbourhood of Ranworth Fen. My stay was not by any means a successful one entomologically, the paucity of nocturnal Lepidoptera being very marked, and nothing but common species falling to my lot. Although the weather was on the whole satisfactory, I saw little or nothing on the wing, in the way of moths. I sugared the alder-bushes by the "Broad," and in other parts of the fens, with little success; some nights, although favourable to all appearance, yielding but few insects, and many of those that did come were worn. *Noctua xanthographa* was on some nights a complete pest, and *N. rubi* pretty abundant. I took a few *Apamea fibrosa*, but not in very good condition, accompanied by such species as *Amphipyra tragopogonis*, *Mania maura*, and other species not worth naming. Two nights' sugaring in a large plantation near the Broad at South Walsham,

where I anticipated great things, judging from the aspect of the place, only yielded a few *Tryphæna janthina*, *Noctua rubi*, &c. I also netted *Leucania phragmitidis*, *Lithosia stramineola*, and a few *Epione apicaria*. Such are the meagre results of a fortnight's work in this part of the fens; I trust notes from other localities may be of a more cheering nature.—ROBERT LADDIMAN; Norwich, September 6, 1880.

VARIETIES OF LEPIDOPTERA.—I have taken a fine variety of *Chortobius Pamphilus* this season, apparently fresh from the pupa, the whole of the wings, except the fringes, being of a clear whitish brown; this I took at Harrow, on the Pinner Road. I also took four very fine specimens of *Paraponyx stratiotalis*, one of them, a large female, with almost all the blotches running into one, making it look like a totally different insect.—F. SHARP; 16, Huntsworth Terrace, Edgware Road, W., Nov. 8, 1880.

HOW INSECTS CROSS THE CHANNEL.—Wishing to examine one of the means of transport offered to insects across the Channel, I searched the steamers on a recent voyage both going to and returning from the Continent. On my voyage I had the good fortune to find two *Bryophila glandifera*, one *Triphæna pronuba*, one *Cosmia trapezina*, one *Xylocampa lithoriza*, besides several bees, wasps, &c. On my return I found three *Plusia gamma* and one *Mania maura*. These are of course only examples of what is usually taking place during the summer season. The continual importation of foreign specimens may have an effect on the lepidopterous fauna of the county.—J. H. LEECH; Shanklin, Oct. 9, 1880.

CAPTURE OF NOLA CENTONALIS.—While collecting on the south coast in August, 1879, I took two or three little moths, which I was afterwards informed were *Nola centonalis*. Being too late to take any more then, I had to wait another twelve months for it. So last August I thoroughly worked the locality, and succeeded in taking a few more, but they appeared very sparingly indeed.—R. HARBOUR; 1, Landport Cottages, Deal, November 24, 1880.

ACIDALIA OCHRATA BRED.—The ten pupæ mentioned in my notice of the larva of this species (Entom. xiii. 306) have all duly hatched. The first moth appeared December 2nd, and the last December 16th, all perfect specimens. The tone of colour

is not quite so deeply ochreous as in the caught examples.—W. H. TUGWELL; 3, Lewisham Road, Greenwich, December, 1880.

A NEW EUPITHECIA.—At the meeting of the Lancashire and Cheshire Entomological Society on December 20th last, Mr. Nicholas Cooke, of Liscard, Cheshire, announced that a moth which he had exhibited at the previous meeting was a *Eupithecia* undoubtedly new to Britain. The insect had been bred by Miss Greening, of Warrington, during July this year. This *Eupithecia* is easily distinguished from any other species of this genus in the list of British Lepidoptera by possessing a dorsal chain of nearly white spots on the abdomen; otherwise it appears closely allied to *E. larivcata*. In compliment to Miss Greening, Mr. Cooke proposed to give it the provisional name of *Eupithecia Blancheata*.—W. E. SHARP; Colonial Chambers, Liverpool, December, 1880.

CEDESTIS GYSSELINELLA IN ENGLAND.—I have to record the capture of this rare Scotch *Tineina* as having occurred on this side of the border. I regret I cannot give the precise locality of its capture, for I am again suffering all the annoyance of finding some collector has either wantonly or carelessly well-nigh exterminated another local species, this last sufferer being the lovely little *Cidaria reticulata*. When I went to look for the larvæ of this species as usual this season, I was disgusted to find the very local food-plant, *Impatiens*, had been destroyed and pulled up, and this quite a month before seeding time.—J. B. HODGKINSON; 15, Spring Bank, Preston, December 6, 1880.

CRAMBUS VERELLUS AT CAMBRIDGE.—In August, 1877, I caught a specimen of this *Crambus* at light amongst *C. falsellus*, which was common. The following year I caught three more in July, also at light. They have remained unnamed till this year, when a comparison with the figure given some years ago in the 'Annual' decided the question.—A. F. GRIFFITH; Cambridge, December, 1880.

OCCURRENCE OF A NEW BRITISH TRICHOPTERON.—At the last meeting of the Glasgow Natural-History Society I exhibited specimens of *Molanna palpata*, M'Lach., a species of caddis-fly new to Britain. It has hitherto been known only from Finland and Siberia; and a specimen from St. Petersburg was found among Kolenati's types of *M. angustata* in the Vienna Museum.

The remarkable form of the third joint of the maxillary palpi in both sexes at once distinguishes it from its congeners. The above species was taken during my stay last summer at Cannich, Strath Glass, Inverness-shire, and occurred commonly all through August. It was the common caddis-fly at all parts of the Strath visited by me. I found it among the margins of lochs by brushing, with the net, the overhanging heather, &c. I cannot remember having seen it flying without its having been first disturbed. *M. angustata*, De Geer, is the only other British species of the genus.—J. J. KING; 207, Sauchiehall St., Glasgow.

ADDITIONS TO THE CASUAL INHABITANTS OF GALLS (see Entom. xii. 113, and xiii. 252).—From pierced galls of *Cynips Kollari*, collected during winter, I bred in May last four specimens of *Coniopteryx teneiformis*, Curt., and three of *Cemiosoma Wailessella*, Staint. As many of the galls occurred at a waste border of a field likely to be inhabited by *Genista tinctoria*, and some of them on twigs only a few inches from the ground, they might have been well over-topped by this plant. I am unable to assert that the plant grew there, but suggest this to account for the presence of the moths. For remarks on the pupation of the *Coniopteryx*, see Westwood's 'Introduction,' ii. 49. From a gall of *Andricus terminalis* I bred, April 4th, a specimen of *Heemerobius nervosus*, Fab. To my disappointment these were the only interlopers I bred.—J. E. FLETCHER; Worcester, November, 1880.

SCIATHERAS TRICHOTUS, Ratz.—In my notice of the *Chalcididae* parasitic on *Calandra* (*Sitophilus*), Entom. xii. 47, I gave the curious tufted-winged species as *Cerocephala formiciformis*, with the string of synonymy almost as copied from Foerster (Hym. Stud. ii. 41). I then felt nearly certain that my specimens, winged in both sexes, could not be the same as the apterous species figured by Haliday. Just lately Mr. E. A. Butler has sent me a plentiful supply of the true *Theocolax formiciformis* in both sexes. These were shaken from the old *Anobium*-eaten wood of an aquarium-stand, and it is certainly parasitic on *Anobium*, as given by most authors. This showed me that my corn-weevil parasites were a distinct species, and they certainly are Ratzeburg's *Sciatheras trichotus*. While looking up the numerous synonyms, and failing to find a copy of Westwood's early paper, published in the 'London and Edinburgh Philosophical Magazine,' the Professor

referred me to his 'Thesaurus Entomologicus Oxoniensis.' There these three interesting and somewhat aberrant genera are clearly differentiated. Although abundantly distinct, Foerster had treated them as synonyms; and Dr. Reinhard gives *Sciatheras* as a synonym of *Cerocephala*, saying that from the peculiar structure, especially of head and wing, there can be no doubt of their identity (Berl. Ent. Zeit. i. 75). Ratzeburg's *Sciatheras trichotus* ('Die Ichneumoniden,' ii. 209, pl. iii., fig. 1) is described by Westwood as new, under the name of *Chaetospila elegans* (Thes. Ent. Ox., p. 137), and beautifully figured, with several details, on plate xxv., fig. 10; this from an old specimen given him by Mr. Raddon, who bred it from maize, where undoubtedly, like my specimens, it was parasitic on *Calandra*. However, Ratzeburg's single specimen was in all probability parasitic on *Hylesinus fraxini*. He speaks of it as "the most remarkable of all the *Chalcididae*." In the 'Entomologist' (Entom. xii. 47) *Cerocephala formiciformis*, Westw., Walk. (et synonymia), should be altered to *Sciatheras trichotus*, Ratz. (= *Chaetospila elegans*, Westw.)—E. A. FITCH; Maldon, Essex.

UNUSUAL ABUNDANCE OF CERTAIN INSECTS.—If we may judge from accounts that have appeared in newspapers and magazines, the year 1880 will be notable for the occurrence of certain insects in unusually great numbers, both at home and abroad. My own experience is also in the same direction, as the following notes from my pocket-book will show:—June 25. To Birchland Wood for afternoon's collecting. Beset by hosts of small flies and brimps (*Tabanidae*). Soon driven from the wood. Six brimps on my legs at one time. Was never so set upon by flies before, and should not have thought it possible in this country. The day was sultry and storm-like, and insects appeared ravenous. The instant I stopped to examine a plant or the contents of my net, two or three common flies attacked each eye and the corners of my mouth; several paid the same attention to my hands, while the brimps did their utmost to draw blood from my legs. Under these circumstances, I acknowledged myself beaten, and retired.—July 1 to 14. Several notes of my horses being terribly bitten by brimps, when at work. The animals were almost unmanageable from the continued torment, their sides being often spotted with blood-drops.—July 20. Horses rendered so restive from brimp-bites while mowing, that one was sent home as beyond control.—

August 26. A sultry day. Myriads of thrips, borne on puffs of hot air. I attended Hamstreet Lamb Fair, and the hundreds of handkerchiefs in hand removing the "ticklers" from the face and neck of the owner was a remarkable sight. At certain times far more attention was paid to hexapods than to quadrupeds. Besides the above I may mention that here, as elsewhere, wasps were more plentiful than they have been for many years past; aphides abounded on everything green, and caterpillars were so numerous as to threaten the very existence of all the cabbage-tribe in my garden. My window-panes have been striped with the ladders made by the larvæ of *Pieris rapæ*, when seeking a place to pupate, and on one day I destroyed no less than two hundred and forty-five larvæ and pupæ of this species round my windows and doors.—THOS. H. HART; Kingsnorth, Kent, Oct. 26, 1880.

SIREX GIGAS AT SUGAR.—One evening in August, while sugar-ing for *Aplecta occulta* at Sandburn, in York, I was rather startled to see a large and perfect specimen of *Sirex gigas* enjoying herself on the sweets I had prepared for my other visitors. Is not this a very unusual occurrence?—W. PREST; 13, Holgate Road, York.

HORNETS IN NORFOLK.—My garden here has been full of them all the summer, and they and the wasps between them devoured certainly half of a magnificent crop of plums. I find several of the hornets every night on my sugar, and one morning I discovered a handsome nest of them in a loft. It hangs suspended from a beam, and is about the size of a moderate pumpkin. If you or any of your correspondents can tell me how to destroy the insects without injuring the nest I should be greatly obliged.—R. S. STANDEN; The White House, Alby, Norwich.

HAGGERSTON ENTOMOLOGICAL SOCIETY.—EXHIBITION.—The Annual Exhibition of the above Society was held November 25th last. The exhibits were confined, with few exceptions, to the captures of the past season. Amongst the more striking boxes shown we remarked the following:—Mr. J. W. Jobson, two cases of Lepidoptera taken in the New Forest, and long series of *Stauropus fagi* taken in Epping Forest. This exhibit was notable for the remarkably fine condition of the insects and the care used in preservation. Messrs. Pearson, T. Eedle, H. Barnes, C. H. Williams, and Jobson showed some very beautifully preserved larvæ and life-histories of Lepidoptera. The latter exhibitor's

larvæ included that of *Acosmetia caliginosa*, reared from eggs, and we believe identified for the first time. It was impossible not to observe the remarkable improvement upon the last Exhibition in the preservation of larvæ. Mr. Boden showed a series of *Peronea caldoniana*, taken in Kent; Mr. Meek a series of *Eupæcilia thuleana*, Vaughan, recently added to the British fauna. Mr. Mardle brought a fine melanic variety of *Hemerophila abruptaria*, and Mr. Eedle a dark form of *Botys urticalis*; Mr. W. J. Harper a fine series of rare moths, including *Plusia bractea* from Lancashire, *P. orichalcea*, *Dasyampa rubiginea*, *Acronyeta strigosa*, *Cymatophora fluctuosa*; Mr. Southey two drawers of Lepidoptera, chiefly from Highgate, in which we noticed some fine *Eupithecia dodoneata*. Mr. J. A. Clark showed the specimen of *Chærocampa celerio* taken in Hackney, which was recorded in error at p. 241, vol. xiii., of Entom., as *Deilephila livornica*; also some fine varieties of *Boarmia repandata* from Highgate. Mr. Ernest Anderson showed a portfolio of very beautiful paintings from China of all orders of insects, executed on rice paper by Chinese artists. A large number of persons interested in Entomology attended the Exhibition.—J. T. C.

WEST LONDON ENTOMOLOGICAL SOCIETY.—The Annual Exhibition of this Society recently took place in the Society's rooms. The following members exhibited drawers or boxes of insects:—Messrs. Goodwin, Longley, Meek, Dow, Gates, Reynolds, Russell, Phipps, Hanson, Silcox, and others. The exhibit of the evening was a very fine series of several hundreds of varieties of *Abraxas grossulariata*, lent by Dr. Harper through Mr. Meek. This was probably the finest lot of varieties ever gathered into one exhibit. Another striking case was of wild plants and flowers, preserved by a new process by Mr. J. English, of Epping. Mr. Boden showed a handsome box of Lepidoptera, and Mr. Meek an interesting and instructive series of British and German Tortrices. The meeting was well attended, and the exhibits generally good.—ED.

THE 'AMERICAN ENTOMOLOGIST' has been incorporated with the 'American Naturalist.'—ED.

ERRATA.—In Dr. White's article on *Orthezia*, Entom. vol. xiii., p. 304, read "1784 and 1785" for "1874 and 1875"; and at p. 305, line 13, for "there is many" read "this is merely."

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VARIETY OF *ARGYNNIS LATHONIA*.



ARGYNNIS LATHONIA, var.

THE beautiful variety, figured above, was taken by me in August, 1876, at the Christiania side of the foot of the Fille Fjeld, in Norway. *A. Lathonia* is widely distributed throughout the South of Norway, and is generally common where it occurs. I have taken it in different years in various localities, but have never before seen any tendency to vary from the normal type. The figure represents the left upper side, and the under side of the right wings.

R. W. BOWYER.

Haileybury, Hertford, December, 1880.

THE MANGOLD-FLY.

By EDWARD A. FITCH.

(Concluded from p. 13.)

LAST June I sent two shrivelled imagos of the mangold feeder to Mr. Meade, who replied, "I cannot determine them with accuracy; they appear, however, to correspond most closely with *Chortophila sulcans* of Schembri and Rondani (see Dipt. Ital.

Prodromus, vi. 211).” In September Mr. Inehbald sent bred specimens to Mr. Meade, who then clearly determined them to be Rondani’s *C. sulcans*. In October I received from Mr. Norgate, through Miss Ormerod, more specimens of both sexes, both bred and captured. These were despatched to Mr. Meade, with Curtis’s description of *P. betæ*: this reply resulted:—“I am very much obliged to you for sending me the description by Curtis of his *A. (P.) betæ*. There can be no doubt whatever that it is the same as *C. sulcans*, though he has overlooked one essential character, viz., that the palpi, though black at their tips, are yellow at the base. His description, as also that by Rondani (*sulcans*), only applies to the male. The female generally has the legs of a paler colour than those of the male, and sometimes the femora of the middle and posterior pairs of legs are entirely testaceous like the tibiæ. This female is described by Rondani under the name of *C. effodiens*. There is no doubt now that Curtis’s name ‘*betæ*’ must take the place of Rondani’s ‘*sulcans*,’ but his description having appeared in an agricultural journal, and not in a purely natural history work, has been overlooked by all systematic writers, though Walker ought to have known it. The *Musca conformis*, Fallen, is a distinct species, of which I have specimens. Fallen’s description is so short that it may be applied to several distinct species, but he is decided upon one point, namely, that the antennæ in *A. conformis* have the two first (basal) joints yellow, while in *C. betæ* they are all three black or grey.”

It is thus far satisfactorily cleared up that the mangold-fly is Curtis’s *betæ*, a most suitable name, and is not Fallen’s *conformis*, as commonly given by most continental authors. Dr. Brauer says “*A. conformis*, Fallen, hails from Sweden, and was described by Meigen from examples in Wiedemann’s collection. The types are, however, no longer in the Winthem collection, consequently an authentic determination is not now possible. Hence the citation of Nördlinger is preferable.” But Curtis’s description appeared eight years earlier, and is only reproduced in his ‘*Farm Insects*,’ p. 397.

The synonymic difficulty is great, but that does not exactly affect the economic question. That which we call the mangold-fly, by any other name would be as noxious. It is, however, necessary that a correct description should appear, and if any

readers of this article possess specimens or living pupæ of the mangold, henbane, or goosefoot leaf-blotchers, I hope they will attempt the solution of this synonymic problem, or transmit the specimens to Mr. R. H. Meade (Bradford, Yorks). The following life-history references should be consulted:—

Curtis. 'Journal R.A.S.E.,' vol. viii., p. 412 (1847). *A. betæ*.

Scholtz. 'Breslau Zeit. für Ent.,' vol. i., Dipt., p. 11 (1849).

A. betæ.*

Nördlinger. 'Die Kleinen Feinde der Landwirthschaft,' p. 556 (1855), *A. conformis*.

Curtis. 'Farm Insects,' p. 396 (1859). *P. betæ*.

Taschenberg. 'Naturgesch. d. Culturpflanzen schäd. wirbellos. Thiere,' pp. 173—5 (1865). *A. conformis*.

Kaltenbach. 'Die Pflanzenfeinde aus d. k. d. Insekten,' pp. 456, 510, 512 (1872—4). *A. betæ*.

Farsky. 'Verh. z-b. Gesell. Wien,' vol. xxix., p. 107 (1880). *A. conformis*.

Taschenberg. 'Praktische Insekten-Kunde,' vol. iv., p. 123 (1880). *A. conformis*.

Holmgren. 'Entomologisk Tidskrift,' vol. i., p. 89 (1880). *Aricia betæ*.

Réaumur. 'Mém. pour servir à l'histoire des Insectes,' vol. iii., pp. 13—19, pl. ii., fig. 13—17 (1737). Feuille mineur de jusquiame.

Goureau. 'Ann. Soc. Ent. France,' 2nd ser., vol. ix., pp. 163—6, pl. vii., 16 (1851). *P. atriplicis*.

Desvoidy. 'Guérin's Rev. et Mag. de Zoologie,' 2nd ser., vol. iii., p. 230 (1851). *P. atriplicis*.

There are several further difficulties—Nördlinger's, Taschenberg's and Farsky's descriptions do not exactly quadrate. Does more than one species blotch the mangold leaves in the larval state? Are the henbane, *Atriplex*, and *Chenopodium* feeders synonymous with our mangold species? Goureau says, "Le Pégomyie de l'Arroche (*P. atriplicis*) se jette aussi sur les Betteraves que l'on cultive dans les jardins, et en dévore des feuilles." Robineau-Desvoidy gives similar information, but

* "*Anthomyia betæ*, mihi (allied to *A. exilis*, Meig., *A. versicolor*, Meig., and *A. mitis*, Fabr.), mines the leaves of *Beta trigyna*, certainly in companies, according to my own observation, making large blotches which sometimes cover the whole leaf." The descriptive part of Dr. Scholtz's papers was not completed, so the description of *A. betæ* never appeared.

adds, "C'est à tort que dans la collection de M. Goureau cette espèce (*P. atriplicis*) est étiquetée *P. hyeregami* (sic), qui constitue une espèce différente." Haliday gives *P. atriplicis* as a synonym of *P. betæ* in his papers on the "Metamorphoses of Diptera" (Nat. Hist. Rev. iv. 187). Rondani gives *A. atriplicis* as a synonym of his *P. chenopodii* (Bull. Soc. Ent. Ital. x. 161). Schiner says, "Goureau's *A. atriplicis* is probably *A. hyoscyami*" (Dipt. Austriaca, i. 652). Zetterstedt is perhaps the best authority on the *Anthomyiidae*, but *A. hyoscyami* is amongst his "species omissæ;" and his countryman, Holmgren, has just described the mangold-feeder as a new species, placing it in Zetterstedt's genus *Aricia*.

This year's attack of *C. betæ* is unfortunate, as it may be calculated to limit the culture of this useful root-crop, which is now so generally extending in the North. However, it is a repeatedly observed fact that these extraordinary appearances are not continued in succeeding seasons; so we may hope it may be with the mangold-fly. This pest destroys the functions of the leaves, frequently called the plant's lungs, and thus causes a species of consumption; it rarely proves fatal, but it affects the growth and health of the plant considerably.

Until we know more of the special habits of this pest no practicable remedy can be given, except the self-evident one to destroy when found,—whether it be the larva in the leaf-blotches, the pupa in the ground, or the fly itself, if you happen to know it.

Maldon, Essex, December 6, 1880.

[Points of specific distinction between *Chortophila betæ*, Curtis, and some nearly-allied species, which all have red or yellow palpi with black ends, and partly rufous or yellow legs.

Genus CHORTOPHILA, Macquart.

PEGOMYIA, R. Desvoidy (prt.).

Eyes bare; contiguous or subcontiguous in the males; style of antennæ naked, or slightly pubescent; alulets small, with the scales equal in length; abdomen narrow, subcylindrical or flattened; sixth longitudinal or anal vein of wings continued to the posterior margin of the wing.

ANALYSIS OF SPECIES.

A. Antennæ entirely black or grey.

Sp. 1. *BETÆ*, *Curtis*.

A.A. Antennæ with the two first joints red.

a. Frontal space black.

Sp. 2. *HYOSCYAMI*, *Panzer*.

b. Frontal space red or yellow.

* Abdomen partially or wholly testaceous.

Sp. 3. *CHENOPODII*, *Rondani*.

** Abdomen entirely grey.

Sp. 4. *CONFORMIS*, *Fallen*.

Sp. 1. *C. betæ*, *Curt.*, *sulcans*, *Rond.*, *atriplicis?*, *Goureau*, *effodiens* (female), *Rond.*—Long. $2\frac{1}{2}$ lin. Eyes subcontiguous in male, separated by a space equal to one-third of the width of the head in female; forehead slightly prominent; frontal space rufous at fore part in male, totally yellow in female, with a white border; palpi yellow with black tips; body yellowish grey in male, and ashy grey in female; thorax with three indistinct brown dorsal stripes; abdomen with three or four longitudinal spots on the back, forming an interrupted dorsal band, nearly obsolete in the female; legs black in the male, with the exception of the four tibiæ, which are tawny; legs of female with femora and tibiæ wholly testaceous, or with the femora partly cinereous, and sometimes striped along their upper surfaces with brown; tarsi black; wings with the external transverse vein slightly oblique.

Sp. 2. *C. hyoscyami*, *Panz.*—Long. $2-2\frac{1}{2}$ lin. Head similar to that of *C. betæ*, except that frontal space is black, and basal joints of antennæ are red; palpi yellow with black tips; thorax ash-grey with five indistinct stripes; abdomen marked as in *C. betæ*, sometimes entirely cinereous, but frequently with a testaceous tinge, particularly towards the apex, which shows through the grey pubescence; legs testaceous with black tarsi, and more or less grey at the bases of the anterior femora; external transverse veins of wings upright.

Sp. 3. *C. chenopodii*, *Rond.*—Long. $2-2\frac{1}{2}$ lin. This species, of which I only know the female, is similar to *C. hyoscyami* in all points, with the exception of having the frontal space yellow and

the abdomen always testaceous. I believe it is only a variety of the same.

Sp. 4. *C. conformis*, Fall.—Long. 3 lin. Only the female of this fly is known. The forehead is decidedly prominent; the frontal space, the cheeks, the two basal joints of the antennæ and base of the palpi all bright yellow; tips of palpi black; thorax and abdomen both ash-grey and immaculate; legs (with the exception of the black tarsi) wholly of a bright reddish yellow colour.—R. H. MEADE.]

LIFE-HISTORIES OF SAWFLIES,

Translated from the Dutch of the late DR. S. C. SNELLEN VAN VOLLENHOVEN.

By J. W. MAY.

(Continued from vol. xii., p. 264.)

TENTHREDO COLON, Kl.

Imago: F. Klug, "Die Blattwespen, nach u. s. w.," in 'Der Gesellsch. Naturforsch. Freunde zu Berlin Magazin,' vol. viii., p. 182, No. 121. Hartig, 'Blatt- und Holzwespen,' p. 312, No. 56.

Larva: Kaltenbach, 'Die Pflanzenfeinde, aus d. Kl. d. Ins.,' p. 251, No. 5.

Tenthredo nigra, ore maculaque duplici ad basin coxarum posticarum albis, abdomine præter basin et pedum maxima parte rufis, alarum squamis ochraceis, stigmatibus fusco, antennis albo annulatis.

On the evening of the 16th of September, 1872, in my garden at Leyden, I observed a caterpillar which was entirely unknown to me, feeding on a fuchsia plant. Considering the very few insects to be found on introduced, half-naturalised plants, I was specially interested in the discovery, and not less so when, on closer observation, I found the supposed caterpillar was a sawfly larva. The following morning I searched over several fuchsia plants, but failed to find any more larvæ of the same species; but on the evening of the same day, in the twilight, I found one more, from which it appeared to me that, as is the case with other sawfly larvæ and some species of Noctuæ, they conceal themselves during the daytime, and perhaps even go

below the surface of the ground, only making their appearance when the shades of evening have commenced.

The larva I had found (fig. 1) appeared to be not full grown. The head was shining, and of an orange tint, shaped like a Leyden cheese, and covered with extremely fine hairs; on either side was a deep black circular spot, having the eye in the centre, and on the posterior part of the vertex—one might almost say on the neck—a small black triangle. From this triangle proceeded two somewhat curved black lines on the first segment, ending behind an almost round black spot on either side. The upper surface of the body, as far as the penultimate segment, appeared to be of a purple colour, and the under surface sordid yellow; in reality, however, the colour of both sides was the same, but the upper surface was covered with purplish brown markings consisting of curved lines, originating from two fine lines running next to each other along the back. The appearance of these curved lines is easier to figure than to describe (see fig. 2). The segments were further divided into many folds (see fig. 3), the greater number of which were covered with rows of little white spines. At the sides, where the skin was pale in colour, were dark oblique transverse lines above all the legs, with the exception of the first pair. The larva had six horny articulated legs, seven pairs of abdominal legs in the middle of the body, and two anal legs. The last two segments were without any markings.

Some days afterwards, I found one of my larvæ in the act of casting its skin. This proceeding was conducted in a singular manner, which, however, I had once before observed in a sawfly larva, namely, by placing itself round a stalk, and holding on by four or six of the middle legs; and I afterwards observed that the shed skin of the larva remained attached to the stalk in that position. The newly-moulted larva was shining greenish yellow, of a more yellow tint than before, and with only faint traces of the markings. A couple of days later the larva assumed the appearance of fig. 4 (see also fig. 5). It was then twenty-three millimetres long; the markings had remained the same as on the preceding skin, with the exception that on the penultimate segment was a three-pointed spot, which, however, might have been merely the appearance through the skin of matter in the intestinal canal about to be ejected; the ground colour was, however, paler. Shortly after this the larva moulted for the last

time, changing entirely both as to colour and markings; it also appeared to have decreased in size. The colour was a darker brownish yellow (figs. 6 and 7). In the place of the former little triangle on the vertex of the head were now to be seen two fine black lines of equal width; the markings on the back were distinctly brown, more sharply defined, and less curved than before; they also extended further, and there was now a black line on the last segment (fig. 7).

The larvæ, for the other had shortly afterwards undergone the same moulting, now ceased eating, and crept into the ground, or rather into the mould which I had placed in their glass, where they made a double cocoon, one of which is represented at fig. 8. I failed, however, to obtain anything from these cocoons, so that my trouble in the matter was thrown away.

On the 21st of the following September, 1873, I found a considerable number of the larvæ of this species on *Circæa lutetiana* in the wood at the Hague, where the plant in question is very common. I could observe no difference between these and the larvæ taken on the fuchsia. I endeavoured to rear a good number, but to my astonishment, in the following spring, with the same result; not a single imago made its appearance. In the mean time I had discovered, from the above-mentioned work of Kaltenbach, that my larvæ were the second state of *Tenthredo Colon*, Klug. I consequently determined to search the plants of *Circæa lutetiana* in the wood in May and June to see if I could find the imago. It was not, however, until the 24th of July, when I had almost thought of giving it up, that I saw a pair of sawflies flying about the plant; this was about one o'clock in the afternoon, and the day was sunny; they seemed to be chasing each other. I captured them, and recognised *T. Colon*. I saw some more the same day, but I was not able to take any of them. On the following day, the sun only coming out now and then, I saw in these intervals of sunshine several imagos evidently about to pair. I captured several pairs, and on taking them home I found they were all the same species. On the following day, however, which was rainy, I could find no more; the weather continued to be wet for some time after, and I never met with the species again.

Compared with the number of larvæ to be found in the wood in the autumn, the number of imagos on the wing was certainly

small; of course this disproportion is, in the first place, to be ascribed to the usual causes limiting, in the case of all animals, the number of individuals arriving at maturity, but also, in the second place, to the long continuance of cold in the spring of 1874, which destroyed so many insects. The question now arises whether I am right in correlating the imagos I had captured with the larvæ I had observed: without doubt to accept such a conclusion would in many cases be taking too much for granted; but when we consider that *Circæa lutetiana* is a very local plant, and that it is used as food by but few insects,—that among these only a single sawfly larva is known, which is the species now under consideration, *T. Colon*,—moreover that my insects completely agree with the description given by Kaltenbach, who succeeded in rearing this species,—I think it will generally be conceded that I am justified in assuming the specific identity of my larvæ with the imagos I captured. Of course from what I have stated above it follows that I had no opportunity of observing the pupa; this is, however, the less to be regretted, seeing that in general the pupæ of sawflies offer no points of interest.

The male imago (figs. 9 and 10) is eleven millimetres long, and expands to twenty-one millimetres. The body is cylindrical and almost equally broad throughout, with the exception of the shoulders, which are somewhat wider, and the head, the breadth of which is caused by the projecting eyes, between which the forehead is deeply indented; the posterior margin of the head is angularly truncated, and even appears to be narrowly bordered.

The head is entirely black, with the exception of the clypeus and the trophi. The clypeus is very deep, roundly emarginate, the upper lip is circular and very projecting; the mandibles are brown at the tip, shading off into black; the 3rd and 5th joints of the maxillary palpi and the last joint of the labial palpi are black at the tip. The ocelli are black and small, and are placed somewhat on an elevation; the basis of the antennæ also projects from the cavity of the face. The antennæ are black, and are nine-jointed; the 2nd joint is inserted obliquely on the 1st; the three penultimate joints are white, the 6th being black at the base.

The thorax, rendered dull by the puncturation, is black, with fine grey pubescence; the tegulæ are pale brown, and the cenchri

white. Between the bases of the intermediate and hinder coxæ on either side is a shining, round, white spot.

The abdomen is very shining, and somewhat flattened from above, being even indented in the middle at the apex. The 1st segment is black, and has a longitudinal slit in the middle of the dorsum, and on either side a rounded, triangular white spot, covered with white hairs; the 2nd is black, the 3rd brown-yellow, with black base; the suture between this and the 4th is black; the remaining segments are brown-yellow, gradually passing over to red-brown; the ventral surface is paler, being even yellow on the 2nd segment.

The wings are tinged with brown, iridescent, narrow as compared with their length; the costal nervure is red-yellow, the nervures enclosing the anterior portion of the anal cell (the so-called lancet-shaped cell) and the transverse nervure in the cell in question are yellow; all the other nervures are black. The stigma is also black, which is one of the chief points of difference between this species and *Tenthredo livida*, L., in which the stigma is pale brown or yellow.

The four anterior legs are long and slender, the two posterior being somewhat more robust. The anterior legs are yellow or yellowish white, with a black line on the hinder side of the coxæ, apophyses, and femora; the intermediate pair are somewhat redder in tint, with similar black markings. The coxæ of the hinder pair are black, spotted with white, as are also the apophyses; the femora are brown-red, with a broad longitudinal line on the inner side; the tibiæ are red with black apices, and are armed with long red terminal spines. The tarsi have the first joint black, the extreme base being red, the three following black, the apical joint being red-brown; the colour of the tarsi, however, differs in individual examples. (For the above description see figs. 9 and 10). The female is but little larger than the male, and differs principally on the following points: the abdomen is a little broader, and the femora are somewhat thicker; of the former the first four segments are black, having the usual white spots a little larger; the 5th, 6th, and 7th segments are brown-red, the 8th and 9th castaneous or black. The sheaths of the saw are black.

The coxæ are entirely black, but the apophyses have white margins, and sometimes a white spot on the under side. The

black line along the posterior femora spreads out much broader towards the knee, where it almost encircles the entire femur. The posterior tarsi appear to me to be narrower.

According to the new catalogue of Hymenoptera the present species must be rather common in the Netherlands; at all events it has been taken in various localities. I am, however, not quite sure that these statements are perfectly correct, as I find mentioned three examples having one-half of the stigma white, which thus clearly do *not* belong to this species, but probably to *T. livida*. The distinction between the two very nearly-allied species does not always appear to me equally clear. According to Klug, Hartig, Kaltenbach, and Kirchner, *T. Colon* occurs in Germany. According to Thomson it is scarce in Sweden. I do not know whether it is found in England, but it appears not to occur in Scotland. I cannot find any notice of its occurrence or non-occurrence in any of the other countries of Europe.

NOTES ON THE LEPIDOPTERA OF NATAL.

BY WILLIAM D. GOOCH, C.E.

(Continued from p. 7.)

NYMPHALIDÆ (*continued*).

IN a previous part of this paper I spoke of the genus *Neptis*, with one representative of which my name is associated. It is essentially a woodland genus, and found chiefly on the coast in bush-lands. The two, *Saclava* and *Goochii*, are very delicate-winged insects, almost rivalling *Pontia Alcesta* in this respect, they are so fragile; the more apparently so, that they are fond of loitering about spots where Spanish needles grow, a weed with long, sharp hook-pointed seed-cases which detach themselves easily; when striking for the insect a number of these "needles," also known as "black Jacks," get into the net and ruin the wings. The only larva of this class which I believe to have fallen to my lot was a very singular one with many spines, those on the 4th and 5th segments being very *dendritic* in character, and branching backwards. The imago on disclosure was so badly developed that I could only proximately identify it as *N. Saclava*.

A very abundant coast insect, which, properly speaking, is closely allied to *Charaxes*, is *Philognoma Varanes* approxi-

mating *N. Candiope* in colour, except for the green veining of the latter, and having the basal parts of the wings of a bright soft white, which makes a conspicuous patch and mark as the butterfly darts rapidly through the sunlight, and which is as suddenly extinguished when it settles on the under side of an orange or other large leaf of a similar character. The under side of the wings, when closed and the insect settled, is so protective that I have often seen one alight immediately before my eyes, and although I had seen it and was looking at it, it was only by close inspection, or perhaps by a quick flutter of the wings as the insect moved, that I could really identify it. The under side has a continuous line transversely of the wings, which imitates the midrib of the leaves, and makes the deception stronger. The transformations have been worked out at King William's Town by Colonel Bowker and Mrs. Barber, I believe, but I have never been successful in obtaining larvæ.

Euryphene cærulea, a Nymphalid, is reputedly Natalian; it is a very handsome butterfly, deep blue above, and red-brown under wings. I have never seen it. It is not improbably a bush insect, and inconspicuous.

Two butterflies, *Crenis Natalensis* and its congener *Crenis Boisduvali*,—which every now and then, depending on the seasons, are most conspicuous by their abundance,—are interesting because the larger variety, *C. Boisduvali*, which is distinctly different, having a different larva, is marked exactly like one form—not, I think, a sexual one—of the other, *Crenis Natalensis*. From my breeding, it was a question whether the larvæ produced both insects from the same brood, although of different characters themselves, or whether the insects bred indifferently the two forms of larvæ. My experiences, as far as I could sum them up, rather indicated a double form both of imago and larva. Certainly both forms of larvæ produced the ochreous-spotted imago. But the ochreous-spotted imago seemed to be a variety (not sexual) in one case, and a constant form in the other. Mr. Spiller would not have any difficulty in settling the question, as the larvæ of both varieties are abundant periodically. The larvæ in one case are spined with divergent stellate spines, and light coloured; in the other shiny, with short simple spines, blue-black on a brown ground. The pupæ are almost identical, fleshy green, with no markings.

The handsome but not conspicuous genus, *Harma*, belongs to

the Nymphalid family. The two varieties known are both hill-top frequenters, as far as my experience teaches me.

Meneris Tulbaghia, a magnificent insect, is practically unknown to me; it is a large up-country butterfly, and the only specimens I have are gifts. It is a well-known Cape insect; indeed is named after an old Dutch governor, Tulbagh. It is closely allied to our English Graylings, but much bigger and brighter, and with large ocelli. The list of South African Nymphalids would be quite incomplete without this butterfly, which occurs freely in the wooded kloofs of Natal.

EURYTELIDÆ.

The *Eurytelidæ* are represented by a very common and a rare insect on the coast-lands, precisely similar, not in the colour, but in the form of the markings, the former, *E. Hiarbas*, being black, with a white stripe; and the latter, *E. Dryope*, deep red-brown, with a yellowish brown stripe. These are so very similar that I am quite prepared to believe them to be abnormal varieties. The habits on the wing and their haunts are similar. The larva and pupa of *E. Hiarbas* are well known to me, being quite common, and feeding on a creeper with something like a Petunia flower. They are both conspicuous by their forms. The larva has two long divergent clubbed and rough horns on its head, and the pupa is remarkable by its angulated, excavated, and alated development. I did not establish sexual difference of markings in the larvæ, although some were green with black marks and others were green all over. As this smoky or black suffusion is not an uncommon feature of a sexual variation in larvæ, I accept it from that point of view.

ERYCINIDÆ.

The *Erycinidæ* are only represented by a very errant type, viz., *Libythæa Labdaca*. This insect was first discovered by Mr. Morant, but appears to be very local, or very irregular in appearance. Five years of collecting never yielded me a specimen, when lo! just as I am leaving Natal, it occurs fairly abundantly, and is taken by several collectors synchronously. As it is an insect that could not be mistaken for anything else on the wing, I fancy it is periodical, which may account for its hitherto rarity in collections. It has long prominent palpi, forming a beak in front of its head; it is otherwise not noticeably marked.

SATYRIDÆ.

The *Satyridæ* have always been associated in my mind with the tradition of a gigantic butterfly that was seen by the former Curator of the Botanic Gardens, Natal, Mr. D. M'Ken, and which, from his description, fitted more closely to the characters of this family than any others. As Mr. M'Ken did not catch the insect it still remains a myth, and is to be looked for in the precipitous ravines of the Inanda Hills, behind Verulam. The species known to me are most conspicuously the "crepuscular" pair, *Cyllo Leda* and *Gnophodes Parmeno*. They used to visit my sugar regularly after sunset and in the moonlight. I have bred *Cyllo Leda*, and found the larvæ correspond fairly with the Indian species of Horsfield and Moore. I am not sure whether I have seen the larvæ of *Parmeno*. I took some that differed very slightly from those of *Leda*, fed on the same food-plant, a broad plaited-leaved grass of woodland habit, and altogether prognosticated *G. Parmeno*, but they were all ichneumonoid, and I did not rear a single specimen, and never found another batch of similar ones. The two insects are so closely congeners that one would imagine the larval differences to be very slight. They are absolutely given to "very shady proceedings," as I never saw them during daylight free on the wing, unless put up when scrambling through dark shaded thickets, on which occasions they settled again almost immediately on the ground amongst dead leaves, &c., which the under side of the wings, especially of *G. Parmeno*, closely mimics; *C. Leda* less so, but still quite enough to make the insect next to invisible when at rest. Both seem to enjoy the hour after sunset; I have seen ten or twelve dipping about, with the peculiar plunge they make in flight, round and round a little patch of their favourite food-plant, the grass above mentioned, in an open glade under trees. My sugar always attracted them freely, even up till 10 or 11 p.m.; on clear nights I have found *C. Leda* especially, sipping the sweets I had purveyed for other guests. The under side of *G. Parmeno* is one of the most lovely studies of greens, greys, and browns in rich and delicate tracery that I am aware of in the insect world; this butterfly does not vary at all in my experience.

Cyllo Leda, on the other hand, is so variable in the size, development, and colour of its ocellic spots on both sides of the wings, that it is difficult to get two specimens exactly the same.

It has been suggested by Mr. Trimen that *G. Parmeno* may be a derived form from *C. Leda*, and the idea commends itself to any one who has examined, closely, a series of the two species from Natal.

Debis Dendrophilus, a very handsome insect, is rare on the coast, and is found in the higher wooded ravines of the country inland. I am consequently not very well acquainted with it; indeed, the great development of this family, *Satyridae*, is better seen in the grass-lands. My particular neighbour was *Hypanis Ilithyia*, which was interesting because of the very singular variety presented by the under side of the wings. A sort of chocolate suffusion, with the dark festoons reversed and shining, whitish instead of dark upon the ground, is the chief characteristic, but at first sight it presented a very dissimilar aspect, the amount of "suffusion," if I can use the expression, was very variable, and the differentiation of the under sides similarly altered.

LYCÆNIDÆ.

The Blues and Coppers are very largely represented, the former especially, in the brilliant *Aphneus* and *Loxura*; they form a very grateful addition to the cabinet. I am unacquainted with many of their transformations, a *Loxura*, bred by Dr. Seaman, of Pinetown, and a small *Lycæna Amarah* by myself, being the sum total.

The Coppers were not freely represented in my neighbourhood; they are more numerous in the open country, with scattered mimosa bush, which makes the Cape and up-country districts peculiar. There are in South Africa many very interesting and varied forms uniting the peculiarities of both these groups. *Myrina Pallene*, too, with its sulphury-white wings, does not do credit to its blue blood by its colour, but it is undoubtedly "pur sang" when examined critically.

The eccentric little butterfly, *Pentila Tropicalis*, belongs to the *Lycænidae*, although at first sight you would not give him credit for doing so. It is very common in two or three woods in the coast woodlands, and is noticeable on account of its funny colour and wings, with spots and tips of a deep neutral purple in some lights, and black in others (this colour soon fades into the latter after first freshness of emergence). It is gregarious, slow in flight, haunting shady spots, and is very like a day-flying

spotted Geometer, which no doubt mimics it. I have had no experience of its transformations.

Lycæna Bætica and *L. Lysimon* occur in Natal, *Bætica* in abundance.

I am afraid that this notice renders scant justice to the really large group of insects which are included in the *Lycænidæ*, but they vary in such small particulars that it is difficult to deal with, except when the cabinet lies open before one.

HESPERIDÆ.

The last family, the *Hesperidæ*, is, although last, not least; it is well demonstrated, and includes some very handsome and special insects. The genera *Leucochitonca* and *Caprona* are both handsome and rare. *L. Paradisea* and *L. bicolor* are very local, strongly-coloured insects, and are probably crepuscular. I have noticed that the *Hesperidæ* are mostly of crepuscular habit. I took two rare insects, viz., *Proteides Fiara* and *Pamphila Dysmephila*, male and female, in the evening, on the wing amongst *Sphingidæ*, feeding, and in each case thought I had either *Lophura Nana* or some small hawk in my net, only finding out my "pot" when I got to the light. All the species—*Ismene Keithloa*, *I. Ratek*, and *I. Valmaran*—are equally fond of sunset, and, although they may be seen during the day, they seem much more alive later. *Caprona Canopus* is a somewhat rare and also conspicuous insect; it is pearly white, with darker cloudings and edgings of brown. It always settles on the under sides of the leaves with its wings open, which is a feature of many of these butterflies. *Nisoniades Ophion* also does the same; it is an insect of allied habits, and has a trick of flying to the light, like a moth at night; I have taken it in that way several times.

Pyrgus is represented pretty freely. *P. vindex*, with its little black and sulphur checkers, is one of the most common of the Natal butterflies. I assisted at the transformations of *Ismene Valmaran* and *I. Ratek*; also of *Pyrgus vindex*. The former have very similar brightly-coloured larvæ, feeding on indigo and a yellow-flowered *Papilionaceous* tree. They struck me as mimicing *D. Chrysippus* in colour and markings, the tentacles wanting. *Pyrgus vindex* rejoices in a powdery-white little caterpillar with a big black head; it feeds on a *Lanium*, on the white under side of whose leaf it is difficult to perceive it.

REMARKS ON OUR DIPTEROUS PLANT-MINERS, AND THE PLANTS THEY AFFECT.

BY PETER INCHBALD, F.L.S.

BEFORE I mention the families of plants, and the mining-larvæ that affect them, it may perhaps be well to say a few words on the habits of life, so far as I have noticed them in my own neighbourhood, of this somewhat neglected group of Diptera. The tunnel, which tells us often of a whole summer's life, may be readily seen on the surface of the leaf. As the larva grows and feeds the tunnel becomes larger and wider; thus the miner adapting itself to its requirements. Sometimes the pulp is consumed by the feeder, and an unsightly blotch is all that is left to evidence its depredations. Sometimes beautiful scroll-work tells of the artistic labours of the little miner. This is especially the case in the primrose-miner, whose tracings may be readily seen on the primrose plants that cover the sloping banks of our green lanes. The pulp, or parenchyma, is detached by a singular instrument, which is readily seen by holding the mined leaf to the light; a black pickaxe-like process is protruded from the mouth. This sways to and fro, often with wonderful rapidity, as it gathers its supply of food. When it is about to assume the pupa-state the larva mostly leaves its tunnel, and seeks either to bury itself in the soil or to attach itself to the decaying leaves that have served it as food and homestead. In some instances I have found the pupa-case attached to the under side of the leaf; this is especially the case in the miners of the primrose and hogweed. These little mining-flies are not so difficult to hatch, if the collector will only imitate Nature in her ways and means. The affected leaves should be put into a large-sized glass-topped box, wherein the larva may continue to feed a little longer. When full-fed it creeps forth, and pupates either among the leaves or at the bottom of the box. I have found a slight sprinkling of water occasionally needed to supply Nature's provision of rain and dew, and this should be continued during all the period of pupational inertness. From my last season's larvæ I am looking for quite a bevy of imagines in April and May.

RANUNCULACEÆ.—In this family I found during the present year two miners,—one in the leaves of *Ranunculus repens*, the

other in those of *Aquilegia vulgaris*. The pupæ from the columbine are of a shining amber, those from the crow-foot of a dark brown.

UMBELLIFERÆ.—I have met with two miners in the leaves of our Umbelliferæ. One tunnels *Angelica sylvestris*; the other, which is far more common, *Heracleum sphondylium*. Several of the latter larvæ have pupated and given forth their tenants, the *Phytomyza albiceps* of Meigen.

CAPRIFOLIACEÆ.—The miner of the honeysuckle, *Lonicera periclymenum*, appears on the wing in spring. It pupates within the mine, and puts on wings during the first sunny days of April. I hatched several last year. It may prove identical with the *Phytomyza aprilina* of Goureau.

COMPOSITÆ.—No fewer than eight of our Composites give evidence of mining Diptera,—*Sonchus*, *Lactuca muralis*, *Lapsana*, *Taraxacum*, *Bellis*, *Tussilago*, *Arctium*, and *Senecio vulgaris*. I have a good supply of pupæ from them all. Those of *Tussilago* and *Senecio* are pale yellow, the others are blackish brown.

LABIATÆ.—The leaves of *Stachys sylvatica* were blotched in September, the larvæ pupating in October. The pupa is dark amber.

PRIMULACEÆ.—The common primrose offers a beautiful mine. The larva, when full-fed, creeps forth and pupates most frequently near the mid-rib or at the foot of the lateral rib; the case is hid among the down on the under side of the leaf. I have above fifty pupæ of this fly. It is somewhat difficult to detect the pupa in its downy covering. I hatched this species in 1873, and it was then supposed to be identical with the *Phytomyza primulæ* of Macquart.

CHENOPODIACEÆ.—I noticed that the leaves of the mangold, *Beta cicla*, were blotched and blistered in the summer by a most voracious larva; whole fields looked as if they had been scorched. I bred the fly, and it proved to be, according to Dr. Meade, the *Anthomyia sulcans* of Rondani, the true *Anthomyia Betæ* of Curtis, who has the prior claim, I am told, as regards the nomenclature.*

POLYGONACEÆ.—*Rumex acetosa* was blistered and blotched by a miner, that proves to be the *Chortophila transversalis* of Zetterstedt. This larva is most ravenous, like that of the mangold, even

* For an exhaustive article upon the dipterous leaf-miner of the mangold, see Mr. Fitch's papers in this and last numbers of Entom. pp. 8 and 25.—ED.

driving its furrow through the mid-rib, and blistering the leaf from end to end.

The Lodge, Hovingham, York, Dec. 22, 1880.

ENTOMOLOGICAL NOTES, CAPTURES, &c.

LYCÆNA ACIS NEAR ADDISCOMBE.—Upon looking over a long series of Blues taken at Croham Hurst during last August, I noticed one which I thought looked very like *L. Acis*. I therefore took it to the British Museum, and Mr. Kirby kindly identified it for me as that species.—A. SIDNEY OLLIFF; 36, Mornington Rd., Regent's Park, N.W.

DESCRIPTION OF A EUPITHECIA NEW TO THE BRITISH LIST.—Wings in shape, colour, and size very much like those of *Eupithecia lariciata*, with about ten strigæ of dark grey, broader and darker at the outer half of the wing; the basal portion being lighter and much the same shade as the under wings. There is a small white spot near the anal angle of the under wing, a small round black spot near the centre of each wing. A notable character is a dorsal chain of nearly white spots on upper ridge of the abdomen; ciliæ dark. The parent moth was taken in the Isle of Man during July, 1879. The eggs were laid by it during the same month, and the larvæ were reared during that summer by the late Mr. Noah Greening, who fed them on dandelion-flowers. The one above described emerged from the pupa in July, 1880, along with others of the same brood, but this one alone came out perfect. In case this should be a species new to Science, I have named it provisionally *Eupithecia Blancheata*, in compliment to Miss Greening, who captured the parent moth.—N. COOKE; Gorsey Hey, Liscard, Birkenhead, January 6, 1881.

ABRAXAS GROSSULARIATA.—I have several times found the ordinary spring brood of larvæ of *Abraxas grossulariata* feeding on *Sedum Telephium* and *S. latifolium* in my garden, where of course there were both currant and gooseberry trees.—H. HARPUR CREWE; Drayton-Beauchamp Rectory, Tring, January 6, 1881.

MICROPTERYX FASTUOSELLA.—I have met with this insect this season. Whether it is a species or only a form of *M. subpur-*

purella, I cannot say. However, I hope some day to clear up the question.—J. B. HODGKINSON; 15, Spring Bank, Preston, December 6, 1880.

LEPIDOPTERA REARED IN 1880.—I forward you a list of some of the Lepidoptera which I have reared out of doors during the past season, with the dates of appearance. These dates, I think, will compare favourably with last year, most of the species being considerably earlier:—April 7th and 20th, bred *Heusimene fimbriana*; middle to end of month a number of *Tephrosia consonaria*, *T. crepuscularia*, and two *Amphydasis prodromaria*; May 1st, *Notodonta trepida* and *N. dromedarius*; May 1st to 12th, a splendid series of *Elachista poella*; 12th, *Cucullia verbasci*, *Nola cristulalis*, and *Notodonta chaonia* (having taken no larvæ of the latter for three years, I was surprised to see a very fine male in my cage, which must have remained in pupa during that period); May 14th and 15th, bred *Nola cristulalis*, *Notodonta dodonæa*, *N. trepida*, two *Stauropus fagi*, *Abrostola triplasia*, and *Ephippiphora nigricostana*; 16th to 20th, *Notodonta dromedarius*, *Nola cristulalis*, *Selenia lunaria*, *Platypteryx falcula*, *P. lacertula*, and several *Ephippiphora nigricostana*; 21st to 25th, several *Cymatophora fluctuosa*, *Macaria notata*, *Notodonta dodonæa*, and *Stauropus fagi*; June 2nd, two *Cucullia lychnitis*. From early in June to the middle of July I reared a magnificent lot of *Axyليا putris*, from larvæ found last autumn feeding on nettle and hop on Hackney Marshes. *Apamea unanimitis* was scarce this season; I succeeded in finding only nine pupæ. The moths emerged end of May and beginning of June, fully a month earlier than last year.—WILLIAM MACHIN; 22, Argyle Road, Carlton Square, E., December, 1880.

THE BLUE BEETLE (*PHÆDON BETULÆ*, Linn.)—During the last two or three years some parts of this district, *i.e.*, the Isle of Ely, have again suffered from the ravages of a coleopteron (*Phædon betulæ*, Linn.), provincially designated the “blue beetle,” which is apparently destructive during both larval and imago states of its existence, and which has attacked, and in some instances destroyed, entire fields of mustard, cress, cabbages, &c. I first noticed the reappearance of this beetle three years ago on a field of white mustard, which it attacked about the time of the formation of the seed-pod, and from the stalks of which it

stripped almost all the cuticle. On the crop of mustard being reaped the beetles transferred themselves to a small breadth of *Kohl Rabi*, of which they entirely consumed, at first the leaves and then the bulb, leaving nothing but the bare stalks. As far as I have observed, the food of this species seems to be confined to plants of the mustard tribe. The perfect insect apparently hibernates, reappearing in the spring on cruciferous plants, which it does not then injure to any extent, and lays its eggs. The egg, elongated, oval, and of a dark orange colour, is laid on the under side of the leaf. The larva feeds at first on the leaves, and when these are exhausted attacks the cuticle of the stem after the habit of the perfect insect, which appears in August, and at once begins to feed on everything cruciferous. On the approach of winter the beetles go in hybernacula, in the soil, or more frequently in the old stems of the stubble of the crop where they have been bred. The regular appearance of this pest of late years has seriously affected the production of these crops, and indeed in some districts entirely precluded their being grown.—HERBERT FORTESCUE FRYER; Chatteris.

POGONOCERUS HISPIDUS AT FINCHLEY.—On looking over some moss, &c., obtained from the Finchley Road on Monday, January 3rd, I was very pleased to find a specimen of the above insect. Last April (1880) I managed to get two specimens from the same locality. Amongst other species, I found *Pterostichus melanarius*, *Stilicus affinis*, *Tachyporus chrysomelinus*, and *Cercyon terminatum*, all of which were very common.—A. SIDNEY OLLIFF; 36, Mornington Road, Regent's Park, N.W., January 7, 1881.

ACOSMETIA CALIGINOSA: SUPPOSED LARVÆ.—At the Haggerston Society's Exhibition last November, I exhibited what I then believed to be larvæ of *A. caliginosa* which I had reared from eggs. This is recorded in the 'Entomologist' at page 25, vol. xiv. I have since found that they are the larvæ of *Rusina tenebrosa*. I regret this error should have occurred. — J. W. JOBSON; Bournemouth, January 14, 1881.

[It is impossible to be too careful in identifying ova. Many mistakes occur through eggs being found in a box with a female moth. Some collectors at once jump to the conclusion that they are those of the insect in the box, and so go to the trouble of rearing common species in mistake for a rarer one.—ED.]

THE RHOPALOCERA OF EUROPE.—We understand that it is intended shortly to issue, in monthly parts, a really good work on this subject. Every species is to be figured in colours, showing the under sides, as well as the varieties when of importance. Probably this work will remove one of the chief difficulties which have stood in the way of English students of European butterflies, for the price will be within the reach of all. The work has been undertaken by Dr. Henry C. Lang, of London, whose knowledge of the subject will be a sufficient guarantee for the accuracy of the descriptions, and notes which are to be given of habits, localities, &c., not only of the imagines, but also of the larvæ. We further understand that there will be occasionally plates of larvæ and pupæ. We sincerely wish that this work may stimulate greater attention to this, the most beautiful, section of European Lepidoptera, by no means so difficult to obtain as many collectors seem to think. Prospectuses may be had on application to West, Newman & Co., 54, Hatton Garden, London.—ED.

OBITUARY.

ETIENNE MULSANT.—This veteran French Coleopterist died at Lyons on the 14th November last, at the ripe age of eighty-three, he having been born on March 2nd, 1797, at Mornant, Rhône. For many years M. Mulsant was librarian of the Public Library at Lyons, which contains about 150,000 volumes and many valuable MSS.; also librarian to the important "Société d'Agriculture, histoire naturelle et arts utiles de Lyon," to whose "Annales" he contributed many valuable communications. These were not only entomological, but observations on vegetable physiology, ornithology, and in fact on almost every branch of Science in any way connected with agriculture. He was the author of a series of elementary scientific manuals; and in 1875 a splendid work on humming-birds was issued from his pen. These various publications serve to show the general scientific knowledge possessed by this eminent entomologist. As an entomologist, Mulsant studied principally the Coleoptera and Hemiptera of France, more especially the former. Possibly no man has contributed more to the natural history of Coleoptera than Etienne Mulsant. He was a good scientific entomologist,

and an excellent observer of the natural habits and life-histories of various species. His 'Histoire naturelle des Coléoptères de France' is a fitting monument to his memory. This appeared originally in twenty-seven distinct parts, or monographs, published either in the Annals of the Linnean or the Agricultural Societies of Lyons, and later republished in separate form at Paris. This great work commenced with the "Longicornes" in 1839, and the last part appeared in 1878. Like many great undertakings it remains unfinished, notwithstanding that forty years' continuous and laborious work had been spent upon it. An instalment made its appearance about every other year, consisting of some hundreds of pages of letterpress and several plates, illustrative of minute structural details, &c. In the compilation of the latter half of this history—since 1863—Mulsant has had a fellow-worker in M. Rey. In 1879 the Prix Dollfus was awarded for this work to the talented authors, MM. Mulsant and Rey, by the Entomological Society of France. Mulsant and Rey commenced a monograph of the Hemiptera (Rhynchota) on a similar plan, under the title of "Histoire naturelle des Punaises de France." Five volumes are published (Lyon, 1865—79). Etienne Mulsant contributed a very large number of articles on the metamorphoses of Coleoptera and "Notes pour servir à l'histoire de —" to the Agricultural and Linnean Societies of Lyons; to the Memoirs of the Academy of Science, of which he was a corresponding member; and occasionally to the "Annales" of the French Entomological Society, being elected a member in its first year, 1832. These were mostly collected in his 'Opuscules Entomologiques,' published at Paris, in sixteen volumes (1852—1875). Many of his memoirs were written in conjunction with other entomologists—Bourcier, Wachanru, Guillebeau, Gacogne, Godart, Victor Mulsant, Mayet, Perroud, Revelière, Lichtenstein, Pellet, and especially Rey. The Royal Society's Catalogues give 261 separate publications. Mulsant was president of the Linnean Society of Lyons, honorary member of the Belgian Entomological Society, a member of the Vienna Society, &c. The list of Mulsant's entomological articles, commencing in 1830, is very long, and, despite the inevitable, we can but regret that it is now closed; still, much as we may regret that so much knowledge is gone from us, we must rejoice that so much is preserved: *littera scripta manet*.—E. A. F.

ACHILLE GUENÉE.—Last year's volume of the 'Entomologist' contained obituary notices of Boisduval and Berce (Entom. xiii. 119). It is now our melancholy duty to chronicle the death of another veteran French Lepidopterist. M. Guenée died, exactly a twelvemonth after his colleague Boisduval, on December 30th last, at Chateaudun, Eure-et-Loire. Possibly of all European lepidopterists Guenée's name was best known in this country, and especially to our readers. Since Henry Doubleday's 'List of British Noctuæ, according to Guenée's arrangement' (Entom. i. 377—81, October, 1842), Guenée's name has occurred more or less frequently in every volume of this periodical. He was of great service to Doubleday in his determination of our British species, thus assisting in the correction and simplification of our nomenclature, and in identifying for him Hübner's and his own types; while on the other hand Guenée obtained a good knowledge of our peculiar British forms and varieties through Doubleday. The list of Guenée's separate publications is somewhat lengthy: the Royal Society's Catalogue mentions forty-seven down to 1873, and six have appeared since; the last in 1879, when his health completely broke down. These are all on Lepidoptera, and are by no means of equal merit; but some, especially his earlier productions, are of great value. With but one or two exceptions they all appeared in the French "Annales," commencing in 1832. His most important work was the "*Spécies général des Lépidoptères*," commenced by Boisduval, and published in the '*Suites à Buffon*.' Volumes five to ten were written by Guenée (Paris, 1852-7), who thus did much to improve our knowledge of the European Noctuæ and Geometræ. He also worked at the Micro-Lepidoptera, with good results among the larger species; his "Index" was published as early as 1845; and his last article (1879) treats of this group. Guenée was an advocate by profession, and was in his seventy-second year when his death occurred. He was one of the honorary members of our Entomological Society, elected in June, 1874; this is the first vacancy since Zetterstedt's death in 1874. His death causes a similar vacancy in the French Entomological Society, which he joined in 1832, though not an original member, and was accorded the higher distinction in 1874. Another gap is thus again made in the ranks of French entomologists.—E. A. F.

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CONTRIBUTIONS TO THE HISTORY OF THE BRITISH PTEROPHORI.

BY RICHARD SOUTH.

“OH! it is only a plume.” With this observation, I venture to say, many collectors of Lepidoptera would, on netting a species of the interesting *Pterophoridae*, turn out the capture. This might be an example of the common but extremely graceful *Pterophorus pentadactylus*, or the unattractive and local *P. zophodactylus*, both failing to arrest sufficient attention to obtain insertion in the cabinet of their captor. Or possibly, supposed difficulties in the way of setting such “leggy beasts” operate as a barrier to this honour.

If the few remarks I am about to offer by way of introduction should haply be the means of enlisting more friends for the British Pterophori, my object will be achieved. I am sure much pleasure will be derived from a study of the group.

As compared with our larger groups of Tortrices and Tineæ, Pterophori do not show up very favourably as regards numbers in our fauna. The known British species are very limited. Thirty-six only are enumerated in our lists. These are divided into two families and three genera, of which the genus *Pterophorus* alone contains thirty-four species, leaving one only to each of the other genera.

The subjoined synonymic list of British Pterophori as they now stand is in accordance with Doubleday’s arrangement:—

PTEROPHORI.

PTEROPHORIDÆ, Zell.

AGDISTES, Hub.

Bennetii, Curt.

PTEROPHORUS, Lat.

Rhododactylus, W. V.

Dichrodactylus, Muhlig.?

Ochrodactylus, Hub.

Pallidactyla, Haw.

Bertrami, Roessl.

Isodactylus, Zell.

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| Trigonodactylus, <i>Haw.</i> | Lithodactylus, <i>Tr.</i> |
| Zetterstedtii, <i>Zell.</i> | <i>Similidactylus</i> , <i>Dale.</i> |
| Acanthodactylus, <i>Hub.</i> | Monodactylus, <i>Linn.</i> |
| <i>Calodactylus</i> , <i>Steph.</i> | <i>Pterodactylus</i> , <i>Haw., D. L.</i> |
| Punctidactylus, <i>Steph.</i> | Lienigianus, <i>Zell.</i> |
| <i>Cosmodactylus</i> , <i>Herr.-Sch.</i> | Tephrodactylus, <i>Hub.</i> |
| Parvidactylus, <i>Haw.</i> | Osteodactylus, <i>Zell.</i> |
| <i>Microdactylus</i> , <i>Steph.</i> | Microdactylus, <i>Hub.</i> |
| Hieracii, <i>Zell.</i> | Paludum, <i>Zell.</i> |
| Teucriti, <i>Greening.</i> | Brachydactylus, <i>Tr.</i> |
| Lætus, <i>Zell.</i> | Galactodactylus, <i>Hub.</i> |
| Pilosellæ, <i>Zell.</i> | Spilodactylus, <i>Curt.</i> |
| Phæodactylus, <i>Hub.</i> | Baliodactylus, <i>Zell.</i> |
| <i>Lunædactyla</i> , <i>Haw.</i> | Tetradactylus, <i>Linn.</i> |
| Serotinus, <i>Zell.</i> | <i>Leucodactylus</i> , <i>W. V.</i> |
| <i>Bipunctidactylus</i> , <i>Haw., D. L.</i> | Pentadactylus, <i>Linn.</i> |
| Aridus, <i>Zell.</i> | |
| Plagiodactylus, <i>Fisch.</i> | ALUCITIDÆ. |
| Zophodactylus, <i>Dup.</i> | ALUCITA, <i>Linn.</i> |
| <i>Loewii</i> , <i>Zell.</i> | ORNEODES, <i>Lat.</i> |
| Hodgkinsoni, <i>Gregs.</i> | Polydactyla, <i>Hub.</i> |
| Pterodactylus, <i>Linn.</i> | <i>Hexadactyla</i> , <i>Linn.?</i> |
| <i>Fuscus</i> , <i>Retz.</i> | |
| <i>Fuscodactylus</i> , <i>D. L.</i> | |

The larvæ, I believe, are less known than the imagines. In future contributions I shall give specific descriptions. For the present purpose, it will suffice to state the general characteristics of the larva of the genus *Pterophorus*. It has sixteen legs, and is more or less fusiform in shape. The body colour is generally some shade of green. The dorsal stripe or line red, brown, or green. There are several warts on each segment, from which a few hairs of variable length are emitted. It does not spin any cocoon, simply fastens itself to a leaf, twig, or stem, by the anal extremity, and changes to a pupa. Sometimes the pupa also is hairy.

Though most of the species are very retired in their habits, both imagines and larvæ are not difficult to obtain, when a clue is found to their whereabouts. When one is "flushed," a diligent search should be made, as others are almost certain to be near.

Plumes occur in a variety of situations. Downs, fens, marshes, woods, hedgerows, &c.; the various localities yielding various species.

On downs *P. parvidactylus* may be observed; a sharp eye and quick hand are necessary to effect its capture on the wing; for though of but small size, it is exceedingly nimble. The larva feeds on thyme, but it is rather slow work searching for this little

fellow. I would suggest collecting sprigs of the plant from places where the insect is known to occur; where thyme grows plentifully, a good bundle might be gathered in May, from which *P. tetradactylus* as well as the above would possibly be obtained.

P. spilodactylus occurs freely amongst its food-plant, *Marrubium vulgare*, on downs at Freshwater, in the Isle of Wight. The plant used to be common on the downs near Ventnor, but is of rare occurrence there now. In several cottage gardens in the island where the wild herb has been transplanted, the insect is to be obtained. The larvæ and pupæ may both be found by day on the upper sides of the leaf, often a large number on a plant. *Marrubium*, I believe, is not often found wild in other parts of England, but where known to grow wild or cultivated this plume should be looked for.

Fleabane (*Inula*) in marshes and other damp places should produce *P. lithodactylus*. The imago may be started from herbage in the daytime, but it is such a sluggish insect that nothing short of actual dislodgment will cause it to get on the wing; even this unwonted energy ceases when it has flown a few yards. Just after dark it becomes a little more lively, and flutters about over the larval pabulum, which I always find to be *Inula dysenterica*. When the leaves of this plant are observed to have a whitened appearance, due to the fleshy part being eaten away, the larvæ may be found if looked for just after dark. They come from their hiding-places at this time. I could never find them in the day, although I knew that they were close at hand, from the evidences of their recent feeding. Young larvæ are to be found in the primary shoots; and it has just occurred to me that possibly when the leaves are fully expanded, they may enter the stem to hide during the daytime. I have frequently pulled up plants, shook them, examined the ground, stones, &c., but never thought to split the stems.

Pterophorus isodactylus and *P. microdactylus* are also to be found in marshes; the former amongst *Senecio aquaticus*, in stems of which the larva feeds. Probably it may affect other plants of the tribe of ragworts. The last-named plume occurs among and near *Eupatorium cannabinum*, the food-plant of the larva, which also feeds in stems.

In salt marshes *Agdistes Bennetii* may be found; the larva

feeds on *Statice limonium*. This is the only British representative of the genus, and may be known by the uncleft wings.

Where there is much golden-rod in woods, *Pterophorus tephrodactylus* and *P. osteodactylus* are likely to be met with. They seem to be somewhat local. The larvæ feed upon the golden-rod, and are to be found thereon from September to May. A free overhauling of the plant in various districts may result in giving new localities for these species.

From hedgerows, ditches, &c., several species are to be obtained. *P. rhododactylus*, I expect, will be found in many new districts, if looked for when the dog-roses are in flower. The larvæ will be mostly found in those flowers that are unable to expand, owing to the petals being fastened together with silk. The eye will soon get accustomed to the appearance of such flowers, and detection become easy. Every one examined must not, however, be expected to yield the object searched for, as the larva of *Cheimatobia brumata* is frequently found lurking within; also odd examples of *Cosmia trapezina*, which in that case assumes the colour of the petals of the rose. A leaf spun with silk to a bud sometimes hides the quarry. I have found the larvæ on garden roses.

Burdock should produce *P. galactodactylus*, as the larva feeds thereon. Examine the under sides of the leaves. If the stems of *Origanum vulgare* are noticed to be partly bitten through, the larva of *P. baliodactylus* should be looked for. The imago flies at dusk. Hedgebanks and ditches will also yield *P. serotinus* among *Galium mollugo*. *P. pentadactylus* is more frequently observed than any other species of the group; in fact, it is hardly possible to fail seeing the "skeleton" moth, as I have sometimes heard it called. I have beaten the larva from nettles as well as convolvulus. *P. monodactylus* is another convolvulus feeder. The imago is often found in gardens in the autumn.

Among *Ononis* may be found *Pterophorus acanthodactylus* and *P. phæodactylus*. The larvæ of both species are best obtained by beating, where that is practicable.

Larvæ of *P. acanthodactylus* have been found feeding on geraniums in a garden. It is also the common plume of the northern moors, where it feeds on *Calluna vulgaris*.

P. trigonodactylus is generally common where coltsfoot is well established. The larvæ feed in the flower stems in March.

Alucita polydactyla is frequently met with, hibernating in outhouses, and in the spring and autumn among honeysuckles, on which the larva feeds.

Most of the foregoing will be obtained by those who care to look for them, during the coming season, and possibly some others of the group.

A few words about "setting" may not be out of place. There is no real difficulty in the satisfactory manipulation of a *Pterophorus* or even of an *Alucita*, provided the insect is in a proper relaxed condition after death. If it is in the least stiff, the legs will be as brittle as glass, snapping off when touched, in the most vexatious and tantalising manner. The feathers of the wings will, moreover, refuse to unfold; a state of things calculated to deter one from any further attempt to become better acquainted with the group.

I use strong liquid ammonia for killing all my insects, except green ones, and even some of these are in no way hurt by it. As far as my experience goes, it is certainly the best agent I know of for successfully killing insects. There may be objections to its use; I have not found any, and even if I had, the splendid flaccidity of specimens under its action would more than balance matters.

Pterophori killed with ammonia may remain in the jar (of course in boxes) all night, and when turned out next morning should be left for about half an hour before pinning. By the way, care must be taken in the latter operation, or legs will be pushed off with the pin's point; let this show quite a quarter of an inch under the thorax. In putting the specimen on the setting-board, do not press the pin far into the cork at first, only just far enough to hold firm whilst the legs are got out of the groove, and drawn partly into position. This being done, press down in the usual fashion, and arrange the legs finally. The wings will be found to spread easily enough.

If the black pins lately introduced by Mr. Meek possess the virtue claimed for them, they are the very things for the insects in question, for unfortunately some of the species are very prone to set up verdigris.

As I stated before, I shall in my next paper describe some of the species, their larvæ and habits. I hope during the year to give an account of the larger proportion of this group.

(To be continued.)

NOTES ON OAK-GALLS IN THE QUERCETUM OF THE ROYAL BOTANIC GARDEN, KEW.

By R. ALLEN ROLFE.

OUR British oak-galls are necessarily confined to the one species of oak indigenous to the country, but where numerous species are growing in close proximity it is not surprising to find that certain galls spread and flourish on other species than our own, namely *Quercus Robur*. Such has been the case in the Quercetum here, and a few notes of the same are now offered to the readers of the 'Entomologist.'

Quercus Robur, L.—This oak has been split up and made into several species by different authors, but they can only be considered as well-marked varieties. DeCandolle, in his 'Prodromus,' makes two subspecies,—*pedunculata*, fruit-stalked; and *sessiliflora*, fruit sessile,—arranging the varieties under them in accordance with the presence or absence of a peduncle to the fruit; intermediate forms, however, occur with peduncles of various lengths. *Q. pubescens* he places under *sessiliflora*, as the fruit is sessile; but as there is a pubescent variety with pedunculate fruit, and the amount of pubescence varies on some forms of *sessiliflora*, I shall treat them as varieties only, enumerating the galls found on each.

Var. Q. PEDUNCULATA, Willd.

Neuroterus numismatis, Ol.—Common.

N. lenticularis, Ol.—Very common.

N. fumipennis, Hart.—Generally distributed, and fairly common.

N. læviusculus, Schenck.—I have only found this gall on one small tree; two leaves are infested, the galls numbering seventy-nine; two leaves the previous year with nineteen galls.

N. ostreus, Hart.—Fairly common.

Spathegaster baccharum, L.—Common.

Andricus curvator, Hart.—Common.

A. inflator, Hart.—Not rare.

A. terminalis, Fab.—Common.

Cynips Kollari, Hart.—Common.

Dryophanta divisa, Hart.—Not rare.

D. scutellaris, Ol.—Not rare.

Aphilothrix gemmæ, L.—Fairly common.

A. autumnalis, Hart.—Two specimens.

A. callidoma, Hart.—Rare, on a small tree.

Var. Q. HAAS, Kotschy.

S. baccharum, L.—Not rare.

C. Kollari, Hart.—Not rare.

Var. Q. FASTIGIATA, *Lam.*

- N. lenticularis*, Ol.—Rare.
S. baccarum, L.—Not common.
C. Kollari, Hart.—Very abundant.
A. gemmæ, L.—Rare.
A. callidoma, Hart.—Rare.

Var. Q. PURPUREA, *Loud.* (Purple variety.)

- S. baccarum*, L.—Rare.
A. terminalis, Fab.—Not rare.

Var. Q. PENDULA, *Loud.* (Weeping variety.)

- S. baccarum*, L.—Rare.

Var. Q. LACINIATA, *Lodd.*, v. *heterophylla*, *Loud.*, v. *filicifolia*, *Hort.*
(Fern-leaved variety.)

- N. numismatis*, Ol.—Abundant.
N. lenticularis, Ol.—Common.
S. baccarum, L.—Rare.
C. Kollari, Hart.—Not rare.

Var. Q. SESSILIFLORA, *Sal.*

- N. numismatis*, Ol.—Not common.
N. lenticularis, Ol.—Common.
N. ostreus, Hart.—Rare.
S. baccarum, L.—Common.
A. terminalis, Fab.—Rare.
C. Kollari, Hart.—Fairly common.
D. divisa, Hart.—Rare.

Var. Q. CONCORDIA, *Hort.* (Golden-leaved variety.)

- N. lenticularis*, Ol.—Three specimens.

Var. Q. DALECHAMPII, *Ten.*

- N. numismatis*, Ol.—Rare.
N. lenticularis, Ol.—Rare.
S. baccarum, L.—Not rare.

Var. Q. PUBESCENS, *Willd.*

- N. lenticularis*, Ol.—Rare.
S. baccarum, L.—Not common.
C. Kollari, Hart.—Not common.
A. terminalis, Fab.—Common.

Q. Toza, *Bosc.*; *Q. Tauzin*, *Pers.*; *Q. pyrenaica*, *Willd.*; *Q. lanuginosa*, *Lam.*; *Q. pubescens*, *Brot.* (non *Willd.*)—This is a very distinct oak; in the spring the young leaves and shoots are covered with a dense pubescence of white hairs, giving the tree a woolly appearance; three species of gall-insects seem to thrive well on it.

N. lenticularis, Ol.—Common on several trees.

S. baccarum, L.—About the same as the last.

C. Kollari, Hart.—Abundant, too much so for the good of some small trees.

Q. LUSITANICA, Webb. (The Portuguese oak.)

N. lenticularis, Ol.—Common on a good sized tree; in 1879 it was rather less common; and I have been told it was plentiful in the previous autumn. I have also seen a specimen of this oak, gathered in 1864, with several of these galls on.

N. fumipennis, Hart.—Not rare in 1879, but I have not seen it this season.

S. baccarum, L.—I examined the tree very minutely several times in 1879 for this gall, thinking it might throw some light on the dimorphic theory, which, if a reality, ought to have produced it, as *N. lenticularis* was common in the previous autumn, and the tree is isolated; my search proved unsuccessful, but this season I was rewarded by finding two galls on one branch, but could discover no more.

D. divisa, Hart.—Half a dozen good specimens.

Var. *Q. TURNERI*, Willd.; *Q. lusitanica*, var. *Clusii*, DC. (Turner's oak).—Supposed to be a hybrid, raised by Mr. Spencer Turner in the Holloway Down Nursery, Essex. A handsome evergreen oak, placed by DeCandolle under *lusitanica*, though I think the old name should be retained in preference to *Clusii*.

N. numismatis, Ol.—Very abundant, literally swarming on the lower leaves, though a small proportion only come to maturity; the rest I imagine are affected by parasites; they are smaller than on *Q. Robur*.

C. Kollari, Hart.—Very common, both this and last season; numbers of the galls which, I believe, are affected by inquilines, do not get larger than a pea, but, instead of the typical form, they are lengthened and have an attenuated, or more correctly an acuminate point; intermediate forms occur, or they would be taken for something else; probably breeding will throw light on this point.

D. scutellaris, Ol.—I have one gall which is undoubtedly this species; it is beautifully suffused with rose-colour, and has preserved the tint in drying, though I fear it will ultimately vanish.

Var. *Q. INFECTORIA*, Oliv.—This is well known as the oak which produces the galls of commerce. DeCandolle places it with *lusitanica* as a subspecies, and, though the tree has a different appearance and is considerably dwarfer, the fruits are almost identical.

N. numismatis, Ol.—Over a dozen galls.

N. lenticularis, Ol.—Slightly commoner than last species.

N. ostreus, Hart.—Three specimens.

S. baccarum, L.—Not rare on several trees.

A. curvator, Hart.—Ten specimens.

QUERCUS GLANDULIFERA, Bl.—This is an evergreen Japanese oak extensively planted at Kew, where it forms dwarfish pyramidal bushes. It exists in nurseries, and has been distributed under the name of *Q. Austriaca hybrida*; but as *Austriaca* is a synonym of *Q. cerris*, it is evident the name is totally wrong. It was figured for the first time in 'Gardeners' Chronicle' for December 4th, 1880, p. 715. It is interesting to note that galls are found on it.

S. baccarum, L.—Common on several trees both in 1879 and 1880, though, as far as I could see, it was confined to the leaves. I bred the maker, also that common parasite *Callimome auratus* from the galls.

A. curvator, Hart.—Several specimens were found in 1879, though I did not observe any in the following season.

D. divisa, Hart.—Occurred sparingly in both seasons.

A. gemmæ, L.—One specimen in 1879.

Q. CERRIS, L. (The mossy-cupped oak).

Andricus glandium, Gir.—Occurred sparingly in the acorns of this species on one large tree in 1879.

Var. Q. LUCOMBEANA, Loud. (the Lucombe oak). — A hybrid between *Q. cerris* and *Q. suber*, raised in the Fulham Nursery, Exeter, by Mr. Lucombe, from seed sown about 1762.

A. glandium, Gir.—Most abundant in 1879 on the large tree near the wire fence; nearly all the acorns were galled, and when they fell in November could be gathered from underneath the tree by hundreds. In a large quantity I collected, the larvæ are still quite healthy and appear neither more nor less likely to assume the perfect state than when collected. This is a curious problem, as the galls appear annually (since 1877), but Mayr notices the fact as quoted 'Entom.' xi. 206, also Miss Ormerod (Entom. xi. 204). Mr. Fitch also wrote me that he has some from the same tree, collected in 1878, in the same condition [still living larvæ—E. A. F.] They probably emerge in the natural state in spring or early summer, and lay their eggs in the young acorns; and these conditions have not been imitated artificially. It is perhaps worthy of note that when in early spring I tried to collect others to see if they were more fully developed, I found something had extracted the larvæ, and nothing but empty galls remained; probably birds or mice in the severe weather,—it looked most like the latter,—but in a large handful of acorns I could not find a single larva remaining. Last autumn the galls were very scarce on the large tree, but were found on a small tree in the oak collection by the river-side. I also noticed that the galled acorns do not reach the full development, but remain in the cup, and do not fall from the tree till some time after those not attacked, and which consequently develop and ripen in the usual manner.

The following shows the botanical range of the galls which affect other oaks than *Q. Robur*; all were found on that species:—

N. numismatis, Ol., found on *Q. Turneri*, Willd., and *Q. infectoria*, Oliv.

N. lenticularis, Ol., found on *Q. Toza*, Bosc., *Q. lusitanica*, Webb, and *Q. infectoria*, Oliv.

N. fumipennis, Hart, found on *Q. lusitanica*, Webb.

N. ostreus, Hart, found on *Q. infectoria*, Oliv.

S. baccarum, L., found on *Q. Toza*, Bosc., *Q. lusitanica*, Webb, *Q. infectoria*, Oliv., and *Q. glandulifera*, Bl.

A. curvator, Hart, found on *Q. infectoria*, Oliv., and *Q. glandulifera*, Bl.

C. Kollari, Hart, found on *Q. Toza*, Bosc., and *Q. Turneri*, Willd.

D. scutellaris, Ol., found on *Q. Turneri*, Willd.

D. divisa, Hart, found on *Q. lusitanica*, Webb, and *Q. glandulifera*, Bl.

A. gemmæ, L., found on *Q. glandulifera*, Bl.

The absence of *N. lenticularis* from *Q. glandulifera* surprised me, perhaps more than anything, as the tree is common and generally distributed throughout the garden, and *S. baccarum* was common in both seasons.

I took special pains to satisfy myself on this point, and went over several trees repeatedly at intervals, the reason being to throw light on the dimorphic theory, if possible; if *N. lenticularis* is only the agamous generation of *S. baccarum*—of which I do not feel satisfied either *pro* or *con*—it ought to occur. On the North-American oaks planted largely—especially *Q. rubra*, *coccinea*, *Phellos*, *aquatica*, *nigra*, and *palustris*—I only found one gall, and that none of the foregoing; it may be new to Britain, and is on the upper side of the leaf. With *Q. cerris* the same thing occurred; it would perhaps be unworthy of note, except that in two or three instances galled branches of *Q. Robur* touched those of that species, thereby giving every facility for spreading to it.

The foregoing notes are offered as a small contribution to our knowledge of gall-distribution; though obviously incomplete,—many species being absent altogether, a fact partly attributable to neglect of the species which appear in early spring,—still I hope they are sufficient to show what an interesting field presents itself for research. The oaks have all been compared with specimens in the Kew Herbarium to avoid errors in nomenclature, a point I would urge as important in future observation. Excepting a few of the galls found on varieties of *Quercus Robur* and that of *Aphilothrix gemmæ* on *Q. glandulifera*, all are now in my collection. I hope next season to pursue the subject further; should anything of interest occur, it will form matter for future notes.

Royal Herbarium, Kew, Surrey, Dec. 8, 1880.

INTRODUCTORY PAPERS ON *ICHNEUMONIDÆ*.

By JOHN B. BRIDGMAN AND EDWARD A. FITCH.

No. II.—*ICHNEUMONIDÆ* (*continued*).

THE *Ichneumones amblypygi* have been tabulated by Holmgren as follows:—

- A. Abdomen oblong or oblong-ovate, depressed, or towards the apex slightly compressed.
- a. Abdomen of female showing 7 segments, the 8th not exerted; antennæ of male not having the flagellum externally dilated.
- * The legs, in relation to their relative lengths, normal.
- † Scutellum moderately convex.
- ‡ Apex of clypeus truncated.
- § Tarsi setose beneath. - - Gen. 2. *Amblyteles*, Wesm.
- §§ Tarsi with very short pubescence, especially in the females; no bristles, or next to none. - - Gen. 3. *Hepiopelmus*, Wesm.
- ‡‡ Apex of clypeus subangulated. - Gen. 4. *Acolobus*, Wesm.

†† Scutellum almost pyramidal.

o Apical margin of the clypeus obtusely subangulated in the middle.

Gen. 5. *Trogus*, Panz.

oo Apical margin of clypeus straight. - Gen. 6. *Automalus*, Wesm.

*** Anterior legs, in proportion to the hinder, rather short, hinder rather stout; tibiæ sometimes subarcuated.

× Above the collar two deep pits, these separated by a little keel or tubercle. Tarsi in both sexes simple. Gen. 7. *Anisobas*, Wesm.

× × Impression of the collar simple. Claws of tarsi in the female pectinated or serrated; male simple. Gen. 8. *Listrodromus*, Wesm.

b. Abdomen of female has the 8th segment shortly exerted; antennæ of male has the 10th to 14th joints of the flagellum subdilated.

Tibiæ slender, hinder somewhat bow-shaped.

Gen. 9. *Hypomecus*, Wesm.

B. Abdomen of the female compressed; apex subtruncated.

Gen. 1. *Limerodes*, Wesm.

The females of this subfamily are easily distinguished by the last ventral segment reaching nearly or quite to the apex of the abdomen, and completely covering the base of the aculeus. The males are not so easily distinguished; the 4th ventral segment, sometimes also the 3rd, or more rarely all the segments, are destitute of the elevated fold; but some have the fold on the 2nd to 4th segments, as *Ambl. fasciatorius*, *A. notatorius*, *A. oratorius*, *A. palliatorius*, *A. spoliator*, and *A. litigiosus*. Some of the males, *Ambl. pallidicornis*, *A. vadatorius*, *A. glaucatorius*, *A. Gravenhorstii*, *A. amatorius*, have the last ventral segment at the apex acuminate. A few have the antennæ slightly thickened and subserrated, *Ambl. divisorius*, *A. fossorius*, and especially *A. flavocinctus*; or incrassated in the middle, *Hyp. albitarsis*.

In the following table some of the distinctions are taken from the size of the gastrocæli, or those pits at the base of the 2nd segment of the abdomen. To save much repetition, by gastrocæli small is meant that the space between is generally wider than the middle area of the post-petiole; the post-petiole is generally divided into three parts, two lateral and a middle area. Gastrocæli large means that the space between them is less than, or about equal to, the width of the middle area of the post-petiole. The aræ of metathorax, either three or five, alludes to the upper surface between the scutellum and the slanting part of the metathorax. On reference to fig. 2 of the plate, the supero-medial area is denoted by fig. 1, and there are two lateral aræ on each side, forming five aræ (see also fig. 3^b); when the cross line dividing each lateral area is absent, then there are but three aræ

(see also fig. 3^a). The posterior areæ are in the same figure divided into three by two distinct lines; fig. 2, 2 is the postero-medial area. The varieties are referred to as in the *Oxyptigi*.

LIMERODES, *Wesm.*

Abdominal segments 1st to 3rd or part of 4th red, remainder black; legs red; apex of hind femora and tibiæ black.

A. Scutellum white; coxæ black.

1. *arctiventris*, 5—5½ lines, male and female.

B. Scutellum black; coxæ red; base of hind tibiæ also black.

2. *cambrensis*, 3¾—4 lines, male.

A *Limerodes* is at once recognisable by its long, slender, compressed abdomen. *A. arctiventris*, Boie, is well figured, with details of abdomen and head, on the plate illustrating Wesmæel's 'Ichneumones Amblyptigi Europæi' (figs. 1-4). This species has been bred from *Eubolia mensuraria* (Boie), *Miana literosa* (Brischke), *Tapinostola Elymi* (Brischke), and Vollenhoven says from a grass-feeding *Noctua*, probably one of the *Leucanidæ*. It is not common in Britain. Although Desvignes said that his *Ichneumon cambrensis* belonged to the *Pneustici*, it is certainly a *Limerodes*; there are two specimens of it in the British Museum, captured near Milford Haven.

AMBLYTELES, *Wesm.*

SECTION 1.—Scutellum and abdomen black.

Legs red; coxæ and trochanters black; hind tarsi brown (female and male). - - - - - 27. *castigator*, 7½—8½ lines.

SECTION 2.—Scutellum pale; abdomen black.

A. Gastrocæli large (females).

a. Areæ of metathorax, three.

* Femora entirely or partly red, sometimes blackish.

28. *fossorius*, 6—7½ lines (*h, t, l, a*).

** Femora black, front one sometimes partly red.

34. *funereus*, 5½—7½ lines.

b. Areæ of metathorax, five; front tibiæ partly pale.

36. *Proteus*, 11—13 lines.

B. Gastrocæli small; areæ of metathorax, five (females).

Tibiæ and femora reddish or fulvous; apex of hinder black.

12. *notatorius*, 7—9 lines (*a*).

A. Areæ of metathorax, five (males).

a. Femora and tibiæ dilute red or orange.

13. *subsericans*, 5½—7 lines (*h, s, a*).

b. Femora black. - - - - -

36. *Proteus*, 11—13 lines.

B. Areæ of metathorax, three (males).

* Abdomen with ventral fold; hind tibiæ towards the base straw-coloured. - - - - - 28. *fossorius*, 6—7½ lines (*h, l, a*).

** Abdomen without ventral fold.

- † Tibiæ white-ringed. - - - 34. *funereus*, $5\frac{1}{2}$ — $7\frac{1}{2}$ lines (*h*).
 †† Femora and tibiæ red. - - - 39. *alticola*, $6\frac{1}{2}$ — $7\frac{1}{2}$ lines.

SECTION 3.—Scutellum more or less pale; abdomen black; apical segments generally pale.

- A. 6th and 7th segments of abdomen white, a; or 7th only more or less white, b (females).
 a. Hind femora black; tibiæ white-ringed. 8. *oratorius*, 6— $7\frac{1}{2}$ lines (*a*).
 b. Femora and tibiæ red. - - - 13. *subsericans*, $5\frac{1}{2}$ —7 lines (*s*, *a*).
 B. 4th to 7th segments with white apical lines; femora and tibiæ fulvous (females). - - - 11. *atratorius*, $6\frac{1}{2}$ lines.

SECTION 4.—Scutellum pale, or with pale marks; some of the segments yellow; apex black.

- A. Hind femora red; tibiæ pale (males).
 a. 3rd segment with two basal lateral spots, or a basal band (or 2nd and 3rd more or less yellow, and one *var.*, 1st, 4th and 5th extreme apical margins pale). Gastrocæli small. Metathoracic areæ, five.
 12. *notatorius*, 7—9 lines (*h*, *a*).
 b. 2nd and 3rd segments orange; 2nd to 6th apical margins pale yellow (this species varies much, to abdomen quite black). Gastrocæli moderate. - - - 35. *Panzeri*, 6 lines (*l*, *a*).
 c. 1st to 4th segments pale orange, base generally black. Gastrocæli small; metathoracic areæ, five. 15. *equitatorius*, 5— $6\frac{1}{2}$ lines.
 B. Hind femora black (males).
 a. 2nd and 3rd segments, sometimes partly the 4th, yellow.
 * Face yellow, sometimes black in the middle.

16. *litigiosus*, $5\frac{1}{2}$ —7 lines (*t*).

** Face black; orbits of eyes occasionally yellow.

24. *conspurcatus*, 7— $7\frac{1}{2}$ lines (*h*, *t*, *a*).

- b. 2nd and 3rd segments orange.
 * 1st to 5th segments, with the apical margins yellow (very rarely obsolete). - - - 7. *amatorius*, $7\frac{1}{2}$ — $8\frac{1}{2}$ lines.

** 2nd to 6th segments sulphur-coloured at the apical margins; 2nd and 3rd sometimes black; apical margins sulphur.

35. *Panzeri*, 6 lines (*l*, *a*).

- c. 1st to 4th segments yellow, base black or red; remainder vari-coloured, yellow or red and black.

14. *crispatorius*, 6—8 lines (*t*, *l*, *a*).

- d. 2nd to 6th segments with yellowish margins.

10. *flavocinctus*, 6— $6\frac{1}{2}$ lines.

BUTTERFLY HUNTING IN NATAL: ON THE COAST-LANDS.

By WILLIAM D. GOOCH, C.E.

A FINE morning, a cloudless sky, and a shimmering haze over everything far and near,—which foretells a good day to see butterfly-life at its best. The summer heats are over, and the rains in late autumn have, but a few days finished, left Nature

redolent of insect-life, of which the late summer broods still linger in somewhat tarnished glory, and the winter early broods are just out in their splendour. This day has been anticipated some little time, for our veteran fly-catcher, from the old colony,* has come up to Natal to see its life, and has come out to stay a day or two to see it in its butterfly form. Last night we had a short look in on the moths, but the end of a thunderstorm had spoilt our sugaring, and there were not many insects to be attended to this morning as the result of our operations, *Pacidara venustissima* being the only notable. To-day, as our intention is to do our neighbourhood thoroughly, I shall take my reader along with us, so far as I can by word-painting, and give him the "carte du pays" equally with my veteran visitor.

Our arrangements were, after a substantial breakfast at 10, to leave our house about 11, and working in a circuitous route, to reach a point some four miles away at about 4 p.m., where the cart was to meet us to bring us back, or perhaps the ladies would pick us up, and extending our drive we should see something of the neighbourhood by a cruise on wheels before returning home to dinner. We occupied the time from bath and "chota hazari," an institution somewhat recognised in Natal plantation life, till breakfast, by a desultory examination of my cabinets on the part of my visitor, with gossip and anecdote, and the arrangement of my over-night sugar captures, a very meagre set, by myself. Our breakfast, a combination of Eastern luxuries, in the way of curried this-or-that, with a cutlet, a salad, and a bottle or two of light wines from the West, and café noir to follow—Natal coffee seven years old and grown on the estate—was sufficiently substantial, and at the same time æsthetic, to satisfy even an entomologist.

At 11 sharp our boys present themselves in the verandah to assist in carrying such paraphernalia as we may require,—sweeping nets, forceps nets, killing bottles, larvæ tins, lengthening pieces to the rods for our *Nymphalid* sugar-sucking friends, and finally a snack for lunch. Their arrival is the signal for the termination of our meal, and the very pleasant gossiping conversation which is the essential accompaniment of our veteran's presence, and we prepare for our expedition by adopting what, to the English mind would be a sufficiently eccentric costume,—a sun-hat with a very considerable puggarie,

* Col. J. H. Bowker, the well-known South African authority and collector.

and leathern gaiters and strong boots, being the most striking features. The former to protect one from the scorching heat, which the day promises; the latter, from the attacks of snakes, which although seldom seen are sufficiently numerous to make incautious movement, such as butterfly catching requires, a dangerous exercise, unless the lower limbs be well protected. Usually the sea breeze, which begins to blow about 10, is somewhat of a hurricane; but this morning there is only enough of it to make the insects more numerous in sheltered spots, and so facilitate our work instead of rendering it a labour. The ladies promise to meet us unless there is a thunderstorm coming up, which they will know before the cart starts, as thunderstorms, unlike anything else colonial, are punctual, and can always be seen approaching from the east by 2 p.m., if they intend to come at all.

Our party—self, veteran, and three boys (one a coolie, the others Kaffirs)—leaving the house, which stands on the slope of a hill, follow one of our paths to a “break-wind” of natural bush, along the leeward edge of which I shall work my way up to a favourite corner, where certain things, if about at all, are sure to be found. Along the double row of orange trees we pass, but do not halt, although *Papilio Demoleus*, *P. Nireus*, and *P. Leonidas* are frequent; the two former are evidently egg-depositing: the veteran has already strolled along this in the morning and summed it up. As we reach the corner of the “break-wind,” *Acræa Cynthia*, *Eurytela Hiarbas*, and *Junonia Clelia* are all found hovering about, and several good specimens are at once taken. *A. Cynthia* is in great numbers, fluttering and hanging settled on dead branches, and apparently, from the look of the specimens taken, only emerged from pupæ this morning, and all of one family. Those in copulâ are captured and noted. *E. Hiarbas*, with its short pendulum flight, oscillating round a mass of creeper, on which its larvæ no doubt may be found; although beating for a minute or two does not yield us any of them, but a good supply of ants, bugs, and spiders, whose powers of “making tracks,” when they find themselves on the beating-net, are simply marvellous. A *Curculio* or two who lie, oppositely inclined, curled up stark, stiff and inanimate, in their peculiar fashion. Whilst we are beating, *P. Merope* first comes into view, and is unerringly taken by the veteran; his condition being doubtful, and as we know where

plenty more are to be found, he is set free, and he retires with somewhat of a dubious flutter. On one side of us now as we advance up the hill is the "break-wind," and on the other an open clearing, formerly, alas, coffee, but now a grand crop of weeds, rank to a degree, and forming a tangle of creepers and undergrowth difficult to get through. We follow, however, a beaten "Kaffir path" between them, which enables us to move along easily, and from which we diverge right or left as the temptation presents itself. Our additions here are several *Pieridæ*:—*P. Saba*, *P. Severina*, &c., visiting the flowering weeds; *Acræa serena* on the open patches of scrub; *A. Protea* in the edge of bush; *Atella phalanta* travelling; *Charaxes Brutus*, male, which costs us a halt, and the use of a lengthening joint for the net to get near him, as he sticks close to the exuding gum on a "flat crown," accompanied by a few large flies, a *Cetonia* or two, *Crenis Boisduvalii* which also falls a victim to our raid, a couple of *Mantidæ* waiting for game, and a hornet, probably collecting material for his nest. *Nymphalis Zoolina*, also, is seen and not captured, as the plunge after him results in the disappearance of our veteran into a tangle of creepers covering a pit of rotten wood, ant-heap, and dust. Recovering, we see also several *Lycænidæ*; and the veteran marks a miss on *Caprona Canopus*. *Nisoniades Ophion*, however, startled by his energy at the miss, falls an incautious victim to his net, settling after his swooping flight, with outspread wings, under the leaves of a feathered spray of a bush-plant, just within easy reach. This spot yields also two or three more of this insect, male and female, which generally occurs in a family. Our boys have fished out a busy tribe of larvæ of *A. Cynthia* on the head of a *Lamium*, which is all spun together by them; as the insect and its transformations have been well worked out by me, after inspection the group is thrown back into the wilderness. A large branch of a tree, a *Ficus*, bearing some dozen of larvæ of *Bunæa forda*, also, is examined and left; and the larvæ of the small sphinx, *Sophura nana*, is collected from a patch of *Galium*, and put in the larvæ tins to be reared. *Diadema Misippus*, male and female, are captured circling over a vacant space with *J. Clelia* and *Anthocaris Evarne*, where dry gravel and sandy subsoil relieve the intense tangle of vegetation. *Philognoma Varanes*, with his sharp flight and Nymphalid dash, is taken as he settles on an outlying orange tree, the indication of

an old patch of garden, which we are approaching ; and here also we first see the black unspotted male of *Nymphalis Ethalion*, but high on the wing, and too lively to be taken, except at rest, by a twenty feet sweep, although we try it ; but the hot sun and the manifest disinclination to be approached, leave him master of the situation. We are now pretty well up the hill, and after breasting the next hundred yards we come to "my" corner, protected from the north-east and east, the prevalent direction of the mid-day breeze. It is open to the west and south, and commands a most extended view, in which is seen Table Mount ; near Maritzburg, on a clear evening, by sunset light, the Umgeni Gorges and the Inanda Hills are the distant features ; and broken bits of sugar plantations, bush clearing, wooded hills, and grass-land with scattered *Mimosæ*, form the chief features of the mid-distance and foreground. At our back is the "break-wind" we have come up, whilst to our right is an old fruit garden hard by, and a patch of heavy brush on the other side, through which we shall descend the hill. On our left still remains the open clearing, equally weed-grown, and now yielding up from an infinity of inconspicuous flowers, as it shimmers in the mid-day heat, a hum of insects, a flutter of flies, and a scent of honey and musk combined, which induces a sense of "Dolce far niente," and a desire to halt in the shade protected from the sun, and get a little cool after the fatigue of ascent, catching as much of the sea breeze as the "break-wind," up which we have reached this spot, allows to percolate through.

Casting my eye towards a certain "flat crown," in a quiet corner, I am gratified by seeing my constant friend and habitué of this spot, *Pseudacraea Tarquinia*, floating and circling lazily around, with its mimic, *Acræa Aganice*, and *Danaïs Echeria*, all together. I call the attention of the veteran to the three, and he is puzzled to make them out. *Echeria* is soon captured. The others remain out of reach, and despite challenges with bits of projectile launched at them, seem about to escape us, when a *Pieris Cleodora* dashing past *P. Tarquinia*, and diving down from the heights above to the fields below, upsets the equanimity of our habitué, who follows him, and, alas, before he can return, is benetted and impaled by the veteran with great content ; meanwhile *Cleodora* becomes mine. Here, also, the heavy and gorgeous moth, *Egybolia vaillantina*, although we have seen him before, first comes within range ; and almost at the same moment

our boys find a batch of its bright yellow and black larvæ on their food-plant in the bush. *Papilio Nireus*, the rapid traveller, passes us with a searching lurch, provocative of a try, although we don't want him; and *P. Merope*, again, is taken; this time, being in good condition, his fate is fixed, and he adorns the veteran's box.

(To be continued.)

ENTOMOLOGICAL NOTES, CAPTURES, &c.

PAPILIO MACHAON NEAR BRISTOL.—A specimen of *Papilio Machaon* has just come into my possession, which was captured last June near Durdham Downs, Clifton. The specimen is minus its tails, and very much battered. It was given alive by its captor to the gentleman from whom I received it.—W. K. MANN; Clifton, Bristol.

DEIOPEIA PULCHELLA IN THE ISLE OF WIGHT.—Last autumn, while searching for fossils on the foundered cliff of Hempstead Hill, in the Isle of Wight, I took a specimen of *Deiopeia pulchella*. When I first took the insect I was unaware of the rarity of the species. The specimen, which was in good condition, is now in the cabinet of T. S. Wilson, Esq., of Edgbaston.—C. ASHFORD; Christchurch.

DESCRIPTION OF THE LARVA OF PLUSIA V-AUREUM.—I have once or twice found the larva of this species myself, and in different years have received eggs or larvæ of it from Messrs. J. Gardner, of Hartlepool, and C. W. Richardson, of Wakefield; but it was not until 1878 that I had satisfactorily reared it through. The eggs are deposited in June or early in July, and are rather small for the size of the moth, round, but flattened above; the colour very pale dull yellow, with a few very minute brown dots. They soon hatch, and the newly emerged larvæ are greyish white, indistinctly spotted with black, and the segmental divisions smoke-colour. They feed on dead nettle (*Lamium*) and other low plants until autumn, when they commence hibernation, having attained the length of half to five-eighths of an inch. In spring they recommence feeding, and by the end of the first week in May are full grown, and may be described as follows:—Length about an inch and a quarter, and stout in proportion; head glossy, has the lobes rounded, and is narrower than the

second segment; body cylindrical, and the segments from 4th to 12th inclusive, of nearly uniform size and width; the 13th segment is small and low, which makes the 12th have a raised and swollen appearance; from the 4th to the head, each segment becomes considerably smaller than the one behind it, giving the anterior of the larva a very pointed appearance; skin rough, and, as well as the head, clothed with a few scattered but rather stiff hairs; the segmental divisions are well defined; and, like others in the genus, there are only six prolegs. Ground colour of the body and head bright apple-green; the mandibles, and a rather broad stripe extending round each cheek, intensely black; dorsal line darker green than the ground colour, and edged on each side with two irregular interrupted white lines; these lines become confluent on the posterior segments, and, with the white encircled tubercles, give the appearance of a somewhat variegated pattern; there is also a very zigzag white line along the subdorsal region, and a white even line above the spiracles; spiracles oblong-oval, placed perpendicularly, cream-colour, encircled with brown; the hairs have the lower part cream-colour, the tips brown. Ventral surface, legs, and prolegs uniformly apple-green. The larva rests with the anterior segments raised from the food-plant, and the back arched like that of a Geometer, which gives it a rather grotesque appearance. Like its relatives, it spins a moderately compact white cocoon amongst its food-plant, through which the black chrysalis can be readily seen. The moth emerges in about a month—that is, in the middle of June.—GEO. T. PORRITT; Highroyd House, Huddersfield, February 4, 1881.

DESCRIPTION OF THE LARVA OF *CIDARIA FULVATA*.—This pretty moth occurs abundantly here on the sandhills amongst the Burnet rose (*Rosa spinosissima*, Linn.), which grows in large masses together with sea rushes, ragwort, hound's-tongue, &c. The larvæ were not uncommon about the beginning of June, but were not easy to obtain, on account of the rose bushes being of such stunted growth, and so mixed up with other plants, it was difficult to push a beating tray beneath the branches. About two dozen were beaten, and a few others found, after rain, drying themselves on exposed twigs. The following is a description of the full-grown larva:—Length, 1' 2" to 1' 3"; head porrected and cordate, smaller than the second segment, pinkish yellow, with a few minute bristles; whole of the upper surface pale

whitish green, becoming darker above the spiracles, and forming an indistinct streak; segmental divisions clearly defined, almost white, but in some examples pale yellow; four minute white dots on each segment; spiracles white; on fifth to eleventh segments inclusive, a conspicuous black dot just below the faint spiracular streak; under surface much paler; anal flap and claspers delicately tinged with pink. There are several varieties of this larva—in some the general colour is dark apple-green; head pinkish brown, with a dark blotch on each side of face; spiracular line purple; under surface yellowish pink; white dots raised and conspicuous; anal flap and claspers dark purple. Another variety is altogether purplish brown, with the ventral area whitish pink. In their various shades of colouring these larvæ bear a strong resemblance to the branches of their food-plant. When full fed, they descend to the ground and spin a cocoon of fine silk mixed with particles of sand just below the surface, in which they change into chestnut-coloured stumpy pupæ.—GERVASE F. MATHEW; Instow, N. Devon, December 17, 1880.

ODONESTIS POTATORIA var.—With reference to Mr. E. Lovett's notice in this month's 'Entomologist,' I beg to state that, while residing in Brittany in 1878, I bred from the larva a very fine variety of *O. potatoria*, a female, having all the colouring and markings of the male.—MRS. GERVASE MATHEW; Instow, North Devon, January 4, 1881.

EPUNDA LUTULENTA, var. *LUNEBURGENSIS*, IN LANCASHIRE.—Last September a fine specimen of the above variety came to light at Dutton. I did not pay much attention to it, but pinned it among some *Luperina testacea*, still thinking it too black for this species, and not like any *E. lutulenta* that I had ever taken. I called Mr. Capper's attention to it. We recognised it as Mr. Nicholas Cooke's moth from Inverness-shire. Here is another instance of the novelties which have turned up during the last two years in the heart of Lancashire. I appear to have had above my share of success. I have, however, left the district.—J. B. HODGKINSON; December 22, 1880.

COLEOPHORA MARINIELLA, *Hodgkn.*—Several of my friends ask me what the *Coleophora mariniella* of my list is. It is a *Coleophora* with anterior wings of a light dull brown, almost like some females of *C. viminetella*. The general appearance at once

separates it from either *C. bicolorella* or *viminetella* by its non-metallic look. The face and head are of a pale ashy colour. The fore wings are more full and rounder than those of any of its congeners. I took five specimens near Fleetwood about seven years ago, and sent them all to Mr. H. T. Stainton, who replied that he did not recognise them, and asked me to try and find cases. As he did not consider it safe to name a species of *Coleophora* until the case had been identified, I have ventured to name it: it may be as long before the case of *mariniella* is found as was that of *C. Fabriciella*, which has not yet been found in perfection: I have known the latter insect for forty years. I still retain three specimens of *mariniella*; I gave one to Mr. Bond and the other to Mr. Mason.—J. B. HODGKINSON; 15, Spring Bank, Preston, January 17, 1881.

INSECTS REARED FROM LARVÆ COLLECTED ON THE ESSEX SALT-MARSHES.—*Tortrix latiorana* is, I think, considered merely a variety of *T. costana*, but the few specimens I reared in July last, from larvæ found on sea-lavender, differ so much, both in the colour of the larva and in the appearance of the moths, from the *T. costana* which I reared from black larvæ collected on various plants in the London districts, that I have now, doubts of their being one and the same species; future experience must decide the question. The larvæ of *Catoptria tripoliana* feed in the seed-heads of *Aster tripolium* in October; when full-fed they construct a tough cocoon from the down of the seed, in which they remain during the winter and spring, changing to pupæ shortly before the emergence of the moths, which takes place in July and August. A few *Eupæcilia affinitana* were reared among the preceding, their habits being very similar, but the imago appears about a month earlier. A fair series of *Gelechia obsoletella* were reared from larvæ found in October on sea-chenopodium and atriplex. *Coleophora artemisicolella* were bred from larvæ collected on *Artemisia maritima* in October. The larva of *C. salinella* occurred in profusion on both sea-chenopodium and atriplex, but comparatively few reached the perfect state. I had the pleasure of capturing one beautiful specimen of the scarce *Asychna æratella* on the marshes early in July. — WILLIAM MACHIN; 22, Argyle Road, Carlton Square, E., December 20, 1880.

LEPIDOPTERA ON THE FLOWERS OF BURDOCK.—While staying

with a friend at Watlingbury, in Kent, during the latter part of July last, I took several specimens each of *Noctua rhomboidea* and *N. Dahlii* on the flowers of Burdock (*Arctium lappa*) growing on the edge of a common. This proved the only way in which we could obtain these two species, though we "sugared" diligently every night. We took a few *Hydræcia nictitans* also on the same plant, and *Noctua baja* positively swarmed at it, some good varieties occurring. I also took near the same spot a couple of *Acidalia straminata*.—[Rev.] CHAS. F. THORNEWILL; Burton-on-Trent.

QUERY AS TO SUGARING GROUND.—There is here an oak wood full of fine timber trees, with a dense and varied undergrowth. To the north and east lies a large park, but on other sides the wood is bounded by cornfields or meadows destitute of trees. Would a circle of trees to the north or east of the wood be likely to prove a profitable sugaring ground, or would it be better to take the trees in the wood? I have thought that, in the former case, whenever the wind should be in a favourable quarter for sugaring operations, it would carry the scent away from the wood where I suppose the best moths are. Would this be much against success?—CHAS. CANDLER; Harleston, Norfolk.

ANCHOMENUS MARGINATUS, L.—During December, 1880, Mr. Wood and myself captured eight specimens of this insect, by digging at roots of trees in Dulwich. I mentioned this to Mr. Billups, who was surprised at the occurrence of this insect so far inland, it being usually found within a mile or two of the coast. Dr. Power was also surprised at it, and suggested that they had been transported from the coast by the Chatham and Dover Railway, which has a station close by.—H. B. PRIM; Leaside, Kingswood Road, Upper Norwood, February 2.

COREMIA QUADRIFASCIATA.—A specimen of this local insect was taken at light by a friend of mine, at Chiselhurst, in June last year. This is, I believe, a new locality for it.—H. B. PRIM; Leaside, Kingswood Road, Upper Norwood, February 2, 1881.

MEGACRONUS INCLINANS, Gr., AT DULWICH.—I took a specimen of this rarity at Dulwich, on the 30th November last, as it was hibernating under the roots of grass. According to the Rev. H. S. Gorham, who kindly identified the specimen for me, this is an old locality for the insect.—THEODORE WOOD; 5, Selwyn Terrace, Jasper Road, Upper Norwood. [I have taken a fair number of

specimens—eight or ten—chiefly in the North of London, as at Highgate and Hampstead.—J. A. P.]

NOTE ON LEAF-MINING DIPTERON.—The subject of the life-history of the leaf-mining Diptera, so ably illustrated by Mr. Fitch in his instructive and learned paper on the “Mangold-fly,” and published in the last two numbers of the ‘Entomologist,’ is so interesting, that any new facts bearing on the subject are worthy of record. In the appendix, which I had the pleasure of adding to Mr. Fitch’s article, I placed the *Chortophila atriplicis* of Goureau among the synonyms of *C. betæ*, thus expressing the opinion that they were probably the same species, following the example of Haliday. This opinion is strongly supported by the fact that in November last I received a specimen of *C. betæ* from the Rev. E. N. Bloomfield, of Guestling Rectory, near Hastings, which he had bred from “larvæ feeding in bladdery mines on *Atriplex* sp. near the sea.” Mr. Bloomfield has kindly promised to follow up this interesting occurrence by trying to find out next summer the name of the species of *Atriplex*, and also, I hope, to collect some more larvæ, and try to breed some more imagines. He also added, in a subsequent letter, “I have little doubt the sea beet was not far of” (from the *Atriplex*), “as I know it grows on the cliffs at no great distance from the place where I found these larvæ.” I hope he may find some larvæ feeding upon the beet, as well as upon the *Atriplex*, and prove whether they both produce the same fly. In December last Mr. C. W. Dale sent me a specimen of Rondani’s *C. chenopodii*, which he had bred from a larva mining the leaves of a dock. This, in addition to other facts of the same nature, leads me to believe that most of the leaf-mining flies are not strictly confined to one species of plant.—R. H. MEADE; Bradford, Yorks., Feb. 18, 1881.

VESPA NORVEGICA AT STAMFORD BRIDGE.—On August 11th last, while collecting Coleoptera on umbelliferous plants at Stamford Bridge, near York, I captured a specimen of *Vespa norvegica*; as this seems one of the rarest of the British wasps, it is perhaps worth recording.—[Rev.] W. W. FOWLER; Lincoln, Feb. 8, 1881.

SCIENTIFIC NOMENCLATURE.—To judge from the name proposed for the new Manx *Eupithecia*, we may expect ere long to be favoured with “Billana,” “Pollyaria,” and similar examples of modern English science and good taste. Surely some step might be taken to stifle these monstrosities at their birth, and to prevent

its being in the power of collectors to debase Science by giving such ridiculous names, and then posing in dignity on priority?—C. A. BRIGGS; 55, Lincoln's Inn Fields, February 1, 1881.

[We quite agree with our correspondent, but do not consider it our province to stifle names which have previously appeared elsewhere.—ED.]

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—The first meeting of the present session of this Society was held January 31, in the Free Library, William Brown Street; the president (Mr. Capper) in the chair. After the minutes of the previous meeting had been read and confirmed, the Society elected the following officers for the current year:—President, Mr. S. J. Capper; vice-president, Mr. Nicholas Cooke; secretary, Dr. J. W. Ellis. After a vote of thanks to the retiring officers, Mr. Capper, in the course of a few remarks, reminded the members that this was the fifth year of their existence, and that they were to be congratulated upon their prosperity.—ED.

COLORADO BEETLES IN SOUTH DEVON.—At the Yealmpton Police-court, on February 8th, Henry William Horton, a farmer, recently returned from Canada, was charged with having had unlawfully in his possession certain living specimens of the Colorado beetle, which he had brought with him from Canada. By section 5 of the Colorado Beetle Order of 1877, it is not lawful for any person to keep any living specimens in any stage of existence, under a penalty of £10. It was proved, and defendant admitted, that he had had living specimens—nearly a score—feeding; but stated that he did not know he was doing wrong to bring a few specimens to show his friends, and that as soon as he heard it was against the law to keep them he destroyed them. He called a witness, who saw defendant throw a number—eight or nine—into the fire. The Bench fined the defendant £5.—Abridged from 'WESTERN DAILY MERCURY,' Feb 9, 1881.

OBITUARY.

WALTER PHILIP WESTON.—It is with sincere regret we record the death, in his twenty-ninth year, of our Correspondent, Walter P. Weston, which occurred on Sunday afternoon, February 20th, at his residence, Auburn Villa, Putney. A notice of his entomological work will appear next month.—ED.

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[No. 215.]

VARIETY OF *MELANTHIA ALBICILLATA*.



MELANTHIA ALBICILLATA var. *SUFFUSA*.

THE pretty variety of *M. albicillata*, figured above, was one of several imagines of this species reared from a batch of eggs by Mr. T. Meldrum, of Ripon, Yorkshire. It appears to be the counterpart of the variety *plumbata* (Curtis) of *M. rubiginata*, which occasionally occurs in the Highlands of Scotland. Having failed to discover this form described elsewhere, I propose to name it *Melanthia albicillata* var. *suffusa*. I have to thank Mr. Meldrum for the opportunity of figuring this example, and also for kindly adding it to my collection.

JOHN T. CARRINGTON.

Royal Aquarium, Westminster, S.W., March, 1881.

CONTRIBUTIONS TO THE HISTORY OF THE BRITISH *PTEROPHORI*.

BY RICHARD SOUTH.

(Continued from p. 53.)

LIFE-HISTORIES of various species of British *Pterophori* have appeared from time to time in the pages of the 'Entomologist' and elsewhere, but these are so scattered as to

be hardly convenient for reference, especially when it possibly happens that even the name of the species, about which we want to learn something, is unknown to us. The student of the larger groups of British Lepidoptera is assisted in his investigations by works treating of the particular group or groups he may wish to study, but should he be inclined to turn his attention to our species of *Pterophori* he is left very much to his own

resources. It may be suggested that we have some account of the group in Mr. Stainton's 'Manual.' True; in that excellent epitome of British Lepidoptera, short descriptions are given of the imagos of some thirty species of "plumes," but no mention is made of their larvæ, except as regards the food-plant. The 'Manual' was published in 1859, and since that time, with the exception of the life-histories just referred to, no attempt has been made to give a systematic history of the British *Pterophori*.

In describing, I shall not aim at the production of an elaborate scientific description; but I hope, by directing attention to the more important specific variations of formation and markings, to enable the student to determine his captures in this group with precision.

The initial step, in identifying a species of the *Pterophoridae* in the imago state, is to note the structure of the anterior wings. These are—with the exception of *Agdistes Bennettii*—always more or less cleft on the hind margin, sometimes so deeply as to separate the wing into two distinct digits; in other cases only dividing the wing into two lobes. I propose to use the term

FIG. 1.

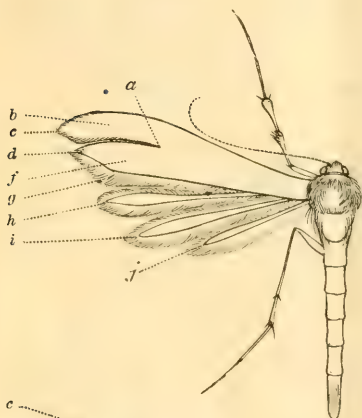


FIG. 2.

FIG. 1.—*P. lithodactylus*. *a*, digital juncture; *b*, outer digit; *c*, tip of outer digit; *d*, tip of inner digit; *e*, angle of outer digit; *f*, inner digit; *g*, angle of inner digit; *h*, 1st feather of hind wing; *i*, 2nd ditto; *j*, 3rd ditto.

FIG. 2.—*P. trigonodactylus*.—Anterior wing.

“digit” in all my descriptions of the perfect insect, calling the part above the fissure the outer digit, and that below the inner digit (see figs. 1 and 2). The hind wings are divided into three distinct feathers; a difference of length, breadth, and coloration of these will often determine the identification of a species. The legs, too, which should always be carefully preserved, are sometimes important in separating nearly allied species; but only in such instances will special reference be made to them.

The accompanying figures will explain the terms which I shall hereafter use.

Anyone looking at a collection of our “plumes,” and observing the various contour of the wings of the species embraced in the genus *Pterophorus*, of the British lists, would naturally conclude that they should be divided into several genera; and so, indeed, they would be in a European collection. There are always objections raised to any innovation in the way of revised nomenclature, when such change is applied to a species only; but when the division of a whole group is contemplated it is advisable to proceed carefully. I have therefore thought that, as most collectors use the “Doubleday” list, both for reference and in the arrangement of their cabinets, it would be better to defer the breaking up of the *Pterophori* as arranged in that list, more especially as I shall not be able to describe the species in the order of classification, but as I can obtain the larvæ. It will, however, be as well if I place before your readers the list as generally accepted by the continental lepidopterists. The arrangement is that of Mons. H. D. Wallingren, a Scandinavian entomologist of repute. It is as follows, so far as those occurring in Britain are concerned, and is somewhat modified from Dr. Wocke in Dr. Staudinger’s Catalogue of 1871:—

CNÆMIDOPHORUS, Wallgn.

RHODODACTYLUS, W. V.

PLATYPTILIA, Hub.

DICHRODACTYLUS, Muhlig.

OCHRODACTYLUS, Hub.

BERTRAMI, Roesel.

ISODACTYLUS, Zell.

TRIGONODACTYLUS, Haw.

ZETTERSTEDTII, Zell.

AMBIXYPTILIA, Hub.

ACANTHODACTYLUS, Hub.

PUNCTIDACTYLUS, Steph.

OXYPTILUS, Z.

PARVIDACTYLUS, Haw.

HIERACII, Zell.

TEUCRII, Greening.

LÆTUS, Zell.

PILOSELLÆ, Zell.

| | |
|------------------------|-----------------------|
| MIMÆSEOPTILUS, Wallgn. | LEIOPTILUS, Wallgn. |
| PHÆODACTYLUS, Hub. | LIENIGIANUS, Zell. |
| SEROTINUS, Zell. | TEPHRADACTYLUS, Hub. |
| ARIDUS, Zell. | OSTEODACTYLUS. |
| PLAGIODACTYLUS, Fisch. | MICRODACTYLUS, Hub. |
| ZOPHODACTYLUS, Zell. | BRACHYDACTYLUS, Tr. |
| HODGKINSONI, Greg. | |
| PTEROEACTYLUS, Linn. | ACIPTILIA, Hub. |
| | GALACTODACTYLUS, Hub. |
| ŒDEMATOPHORUS, Wallgn. | SPILODACTYLUS, Curt. |
| LITHODACTYLUS, Tr. | BALIODACTYLUS, Zell. |
| | TETRADACTYLUS, Linn. |
| PTEROPHORUS, Wallgn. | PENTADACTYLUS, Linn. |
| MONODACTYLUS, Linn. | PALUDUM, Zell. |

I do not propose at present to comment upon the foregoing list, but I hope when I have got through the life-histories of our British species to return to this subject, and shall also have a few words to say about the present position of the group in the Doubleday arrangement of British Lepidoptera.

I said in my last paper that I would describe some of the species in my next contribution, but no doubt your readers will have observed at the head of the Exchange list, in the March number of the 'Entomologist,' that it is intended to give plates illustrative of the descriptions, showing figures of imago, pupæ, larvæ, and food-plant. This will obviously necessitate some little delay in the publication, which will proceed as fast as the necessary material for figuring comes to hand.

It may be reasonably assumed, when more observers are at work on the *Pterophori*, and the larvæ assiduously hunted for and collected, that not only will some of the rarities be deprived of their claim to be considered rare, but a new species or two may be added to our list. As a guide I will refer to three of our rarer and one continental species of *Pterophoridae*. The larva of *Pterophorus brachydactylus* is said to feed on *Lactuca muralis* in June. I should, however, think it more likely to be found on *L. saligna*. This latter plant is not of such general distribution as *L. muralis*, but it occurs in those few places where the insect in question has been taken; therefore I shall not be considered to draw rash conclusions if I suppose the restricted range of *P. brachydactylus* to be due to its predilection for the scarcer species of *Lactuca*. I well know that "plume" larvæ found upon one species of a tribe of plants will also frequently feed upon other

species of that tribe; but I also know that they evince a decided preference for one species, and are generally to be found only on that pabulum. On the Continent *Pterophorus letus* is said to feed in June on *Andryala sinuata*, and *P. aridus* in April and May on *Coris monspeliensis*. Imagos of both species have occurred in this country; the former, in Norfolk, not unfrequently. *Pterophorus didactylus*, Z., feeds on the Continent in May on the flowers of *Geum rivale*. This plant seems to affect damp meadows and mountainous woods; in the Highlands it grows to an elevation of nearly 2800 feet. The larva feeds in the evening, and rests on the flower-stems by day. Neither larvæ nor imago have hitherto been observed in this country, but possibly may be discovered here in some habitat of the plant. The water avens (*Geum*) flowers during May, June, and July, in Britain.

In concluding this introduction to my contribution to the history of the British *Pterophori*, I venture to ask the co-operation of your readers during the coming season in assisting me to obtain larvæ, with the food-plants, for figuring. I shall only be too happy to acknowledge such assistance. These larvæ should be full grown, unless the younger forms differ materially from the adults. The paragraph on this subject, in the Exchange list, will give the necessary particulars. I think it probable that many larvæ of this group will be more easily found feeding after dusk; at any rate, I know such is the case with several species.

London, March 12, 1881.

INTRODUCTORY PAPERS ON ICHNEUMONIDÆ.

BY JOHN B. BRIDGMAN AND EDWARD A. FITCH.

No. II.—ICHNEUMONIDÆ (*continued*).

SECTION 5.—Scutellum pale; apex of abdomen and generally the middle spotted or banded with yellow or white.

A. 2nd and 3rd segments yellow or fulvous, with or without black marks (females).

a. Apical margins of remaining segments yellow.

* Metathorax armed with two acute spines; legs yellow and black varied. - - - - - 5. *armatorius*, 6—8 lines.

** Metathorax not so armed.

† Gastrocæli scarcely perceptible; tibiæ, tarsi, and antennæ tawny-yellow; apex brown. - - - - - 6. *infractorius*, 6—7 lines.

- †† Gastrocæli very distinct; antennæ white-ringed; tarsi and tibiæ straw-yellow, apex of hinder black. 2. *trifasciatus*, 6—7½ lines.
- b. 6th and 7th segments entirely, or margins, fulvous; tibiæ yellowish, apex of hind one black.
- * Scutellum yellow. - - - - 1. *palliatorius*, 6—8 lines (a).
- ** Scutellum white. - - - - - *cerinthius*, 5—5½ lines.
- B. Abdomen red; apex of 1st and 2nd segments widely yellow; 1st, 3rd, and 4th generally black at the base (females).
- Tarsi and tibiæ orange, apex of hinder brown.
14. *crispatorius*, 6—8 lines (t).
- C. Basal or intermediate segments with pale spots (females).
- a. 2nd and 3rd segments with pale lateral spots; apical segments pale marked.
- * Femora black; the spots on 2nd and 3rd segments large and yellow; tarsi and tibiæ yellow, apex of hinder black.
4. *monitorius*, 6½—7 lines.
- ** Femora fulvous.
- † Head moderately narrowed behind the eyes (spots on one or both segments sometimes wanting). - 12. *notatorius*, 7—9 lines (a).
- †† Head nearly straight behind the eyes. - 11. *atratorius*, 6½ lines.
- b. Basal segment or segments with the apical margins white; or with white lateral spots—1st to 3rd, or 1st and 2nd, or 1st, segments marked.
- Legs black; tibiæ broadly white-ringed.
- Gastrocæli small; metathoracic areæ, three.
- † Frontal orbits broadly reddish straw-coloured.
9. *marginoguttatus*, 6 lines (a).
- †† Frontal orbits broadly marked with white.
8. *oratorius*, 6—7½ lines (a).
- c. The last four or five apical segments with greenish white lateral bands (also male). - - - 17. *glaucoatorius*, 5½—7½ lines.
- A. 2nd and 3rd or 4th segments yellow, more or less marked with black; remaining segments with yellow margins (males).
- a. Gastrocæli subobsolete.
- * 2nd segment at the base, 3rd base and apex, yellow.
6. *infractorius*, 6—7 lines.
- ** 2nd and 3rd segments with large lateral spots.
4. *monitorius*, 6½—7 lines.
- b. Gastrocæli distinct; tarsi and tibiæ yellowish, apex of hinder brown.
20. *occisorius*, 5½—8 lines (h, s, a).
- B. 2nd to 4th segments yellow, or marked with black; apex of abdomen pale (males).
- a. Metathorax armed with two acute spines. 5. *armatorius*, 6—8 lines.
- b. Metathorax not so armed.
- * Scutellum yellow.
- † Gastrocæli slightly impressed. - 1. *palliatorius*, 6—8 lines (h, a).
- †† Gastrocæli very distinct. - - - 2. *trifasciatus*, 6—7½ lines.
- ** Scutellum white. - - - - - *cerinthius*, 5—5½ lines.
- C. 1st and 2nd, or 3rd, basal segments with white lateral spots or lines (sometimes wanting); 6th and 7th, or 7th alone, white marked (males).
- Gastrocæli small; metathoracic areæ, 3;

† Antennæ black; tibiæ with a broad yellowish-white ring.

9. *margineguttatus*, 6—7 lines (*a*).

†† Antennæ and tibiæ white-ringed. - 8. *oratorius*, 6—7½ lines (*a*).

D. Segments 1st to 4th yellow, base black or red; the remainder variously marked with yellow and black, or quite black (males).

14. *crispatorius*, 6—8 lines (*t*).

SECTION 6.—Scutellum pale; abdomen red and black; apex white or yellow.

A. 2nd and 3rd segments red, sometimes marked with black (females).
Gastrocæli small.

a. Areæ of metathorax, three.

* Orbits of the eyes yellowish.

Tibiæ red or tawny-yellow, the last or last two, base and apex black.

3. *spoliator*, 6—8 lines (*l, a*).

** Orbits of eyes black, rarely inside partly red.

† Hinder femora red.

† Antennæ white-ringed, most frequently tricoloured.

19. *vadatorius*, 6—8½ lines.

†† Antennæ not white-ringed; base yellowish, apex fuscous.

18. *pallidicornis*, 6 lines.

†† Hinder femora black.

§ 6th joint of flagellum of antennæ subquadrate.

21. *Gravenhorstii*, 6—8 lines.

§§ 2nd and 3rd joints of flagellum subquadrate; tibiæ and tarsi spined.

20. *occisorius*, 5½—8 lines.

b. Areæ of metathorax, five.

× Head behind the eyes not narrowed; greater part of legs nigropiceous; antennæ sometimes with no white ring.

22. *negatorius*, 6—8½ lines (*s, a*).

× × Head behind the eyes obliquely narrowed; antennæ without white ring. - - - - 23. *uniguttatus*, 6—7 lines (*s, a*).

B. 1st to 3rd segments of abdomen red; petiole more or less black; 5th to 7th white-margined (females).

Gastrocæli large; metathoracic areæ, five; tibiæ red, apex of hind one black. - - - - 38. *strigatorius*, 5—6 lines (*a*).

C. 2nd segment of abdomen red; apex of 2nd to 7th with pale yellow margins (females).

Tibiæ and tarsi pale orange. - - - 7. *amatorius*, 6½—8½ lines.

A. 2nd and 3rd segments red; sometimes marked with black (males).

Gastrocæli small.

a. Metathoracic areæ, three.

* Hinder femora red.

† Antennæ black above; 4th to 7th segments widely margined with white at the apex. - - - - 19. *vadatorius*, 6 lines.

†† Antennæ yellowish; apex fuscous; 6th and 7th segments whitish.

18. *pallidicornis*, 6 lines.

** Hinder femora black.

‡ 4th to 7th segments with a white apical spot.

21. *Gravenhorstii*, 6—8 lines (*h, a*).

- †† 4th or 5th to 7th segments with the apical margins yellowish.
 20. *occisorius*, $5\frac{1}{2}$ —8 lines (*h*, *s*, *a*).
 b. Metathoracic areæ, five.
 § Head behind the eyes not narrowed. 22. *negatorius*, 6— $8\frac{1}{2}$ lines (*a*).
 §§ Head behind the eyes obliquely narrowed.
 23. *uniguttatus*, 6—7 lines (*l*, *a*).
 B. 1st to 3rd segments red, and sometimes 4th more or less; petiole more or less black (males).
 Tibiæ red, apex of hind one black. - 38. *strigatorius*, 5—6 lines.

SECTION 7.—Scutellum pale; abdomen red, or red and black.

- A. Gastrocæli small (females).
 a. Areæ of metathorax, five.
 * Abdomen red; middle segments blackish at the base; hind femora red. - - - - 15. *equitatorius*, $5-6\frac{1}{2}$ lines (*h*, *a*).
 ** 2nd and 3rd, and sometimes partly the 4th, segments red; incision of 2nd fuscous black; hind femora black.
 16. *litigiosus*, $5\frac{1}{2}$ —7 lines (*t*, *a*).
 b. Areæ of metathorax, three.
 2nd and 3rd segments red; front legs partly red.
 39. *alticola*, $6\frac{1}{2}$ — $7\frac{1}{2}$ lines.
 B. Gastrocæli moderate, or rather large (females).
 a. Segments 2nd to 7th, tibiæ and tarsi, red. 37. *fusorius*, 8—10 lines.
 b. Abdomen chestnut, base black.
 * Hind tibiæ red; apex and extreme base black.
 33. *repentinus*, $5\frac{1}{2}$ —7 lines.

Note.—Gravenhorst described *I. melanocastanus* and *I. repentinus* as distinct species. Wesmael, in 'Tentamen,' united them, placing the latter as a *var.* of the former, but separated them in *Bul. Ac. Brux.*, 1857, as Mr. Marshall has done in his list; but Holmgren has united them thus:—

Var. 1, male and female. Scutello nigro.

Ichneumon melanocastanus, Grav., I. E., i., 553.

Amblyteles melanocastanus, Wesm. Tent., 135.

Var. 2, male and female. Scutello toto vel apice albo.

Ichneumon repentinus, Grav., I. E., i., 467.

These two varieties are quoted by Wesmael in 'Tentamen,' with the same distinctive marks. From this it would appear one has a pale scutellum, the other has not.

- ** Hind tibiæ almost entirely black.
 Metathoracic areæ *subquinque*. - 31. *mesocastanus*, 5—7 lines (*a*).
 c. 2nd and 3rd segments red; the 4th sometimes marked with red; margins of red segments generally obscure.
 † 2nd and 3rd segments entirely red.
 † Areæ of metathorax, three; hind tibiæ reddish or brown; apex black.
 30. *messorius*, 6—7 lines (*l*, *a*).
 †† Areæ of metathorax, indistinctly five; hind tibiæ not reddish at the base. - - - 31. *mesocastanus*, 5—7 lines (*a*).
 †† Apical margins of 2nd and 3rd generally black (§), or segments more or less black, entirely so, or quite red (§§).

§ Postero-medial area of metathorax divided into three by two distinct lines; hind tibiæ almost entirely obscure.

29. *divisorius*, $7\frac{1}{2}$ — $8\frac{1}{2}$ lines (*l*).

§§ Postero-medial area of metathorax with two indistinct lines, or none at all; hind tibiæ towards the base whitish yellow or straw-coloured.

28. *fossorius*, 6— $7\frac{1}{2}$ lines (*l*, *a*).

A. *Gastrocæli* small (males).

2nd and 3rd segments fulvous-red, or 3rd segment more or less in the middle, or entirely black, or 2nd and 3rd fulvous; 2nd to 4th apical margins yellow. - 23. *uniguttatus*, 6—7 lines (*a*, *l*).

Note.—In Marshall's list *A. conspurcatus* is No. 24, which Wesmael says has a broader abdomen than *A. uniguttatus*, but is very like it. He further says, 'Amblypygi Europæi,' p. 40, that in the course of his experience of *A. uniguttatus* and *A. conspurcatus* he has noticed many specimens which are very much alike, and gives a list of three females and ten males, but will not say they all belong to the same species; still it is a remarkable coincidence that Holmgren, in his 'Ichneumonologia Suecica,' although he describes forty-three species, does not mention any one of these thirteen insects. This certainly seems to confirm Wesmael's opinion that they may be varieties of one species. Tischbein retains *A. conspurcatus* as a good species, with the remark, "not found here" (Birkenfeld).

B. *Gastrocæli* moderate (males).

a. *Areæ* of metathorax, three. .

* Abdomen reddish; base black.

† Colour of abdomen red. - - - 37. *fusorius*, 8—10 lines.

†† Colour of abdomen chestnut. - - - 33. *repentinus*, $5\frac{1}{2}$ —7 lines.

** 2nd and 3rd segments red, or marked with black; 4th sometimes partly red.

‡ Hind tibiæ white; apex and below the base black.

29. *divisorius*, $7\frac{1}{2}$ — $8\frac{1}{2}$ lines (*h*, *l*, *a*).

†† Hind tibiæ red; apex black. - 30. *messorius*, 6—7 lines (*a*).

††† Hind tibiæ towards the base more or less straw-coloured.

28. *fossorius*, 6— $7\frac{1}{2}$ lines (*l*, *a*).

b. *Areæ* of metathorax, indistinctly five.

5th segment sometimes castaneous; tibiæ semiannulated with white.

31. *mesocastanus*, 5—7 lines (*h*, *a*).

SECTION 8.—Scutellum black; abdomen red, or red and black.

A. Abdomen red, base black (females and males).

a. *Gastrocæli* small; *areæ* of metathorax, five; legs dark.

25. *castanopygus*, $5\frac{1}{2}$ —7 lines.

b. *Gastrocæli* rather large; *areæ* of metathorax, three; greater part of femora and tibiæ red. - 32. *melanocastanus*, $5\frac{1}{2}$ —7 lines (*s*, *l*).

B. Segments 2nd to 3rd or 4th red, or marked with black (males).

* Antennæ white-ringed; abdomen sometimes quite black.

26. *sputator*, $5\frac{1}{2}$ —7 lines (*l*, *a*).

** Antennæ not white-ringed; *gastrocæli* small.

3. *spoliator*, 6—8 lines (*t*, *a*, *l*).

C. Segments 2nd to 3rd or 4th red, or marked with black (females).

† Tibiæ black.

- † Metathoracic spiracles linear-elongate; stigma of wings red.
 23. *uniguttatus*, 5—6 lines (*s, a*).
 †† Metathoracic spiracles rather short; stigma fuscous.
 35. *Panzeri*, $4\frac{1}{2}$ —6 lines (*l, a*).
 †† Tibiæ red. 26. *sputator*, 6 lines.
-

THE COCOONS OF *HYDROPHILUS PICEUS* AND *HYDROBIUS FUSCIPES*.

BY ABBOTT G. LAKER.

IN the summer of 1878 I had the opportunity of examining a good many cocoons of *Hydrophilus piceus*, and, as I have seen various and somewhat conflicting accounts given of these cocoons, my notes on the subject may possibly be of some interest to persons who have studied the habits of water insects.

The cocoons were taken from a pond in the south-east of London between June 9th and July 1st. They varied considerably in size and shape, but on the average were about $11\frac{1}{2}$ lines long by $10\frac{3}{4}$ lines broad, and the height from the bottom to the tip of the spike was about 17 lines. The walls of these nests were composed of a substance very like whitey-brown paper, but the portion of the cocoon immediately under the spike was in each case closed simply by a loose downy material, which would not be impervious to water, and as this part was submerged, it is clear the enclosed eggs must be constantly moist. I have seen it stated these cocoons are water-tight, but this is not in accordance with my experience.

The interior of the nest contains a loose silky substance similar to that at the en' immediately beneath the spike, and the eggs are arranged with great regularity, their ends resting on the bottom of the cocoon. The young larvæ, when mature, break through the silky substance mentioned above, but before they are ready to emerge they are capable of some degree of movement.

The cocoons, whilst the eggs are unhatched, are very buoyant, and, if allowed to float loose they are only submerged to about two-thirds of their depth. I have found them floating, and only surrounded with *Confervæ*, but most of the specimens I have taken have been attached to the long grass growing in the water near the margin of the pond, or else attached to the under side of

a floating aquatic leaf; and in the latter case the spike has always protruded beyond the edge of the leaf, but the cocoon itself has been hidden from above, but it would of course have been conspicuous from beneath the surface of the water.

It seems reasonable to suppose that the long spike with which these cocoons are furnished should perform some definite office, but I have been unable to determine what it is. The spike consists of a substance somewhat thicker and stronger than the rest of the cocoon, and is hollow throughout the greater part of its length, except that it is crossed and recrossed inside with a dark thread-like substance, thus somewhat resembling a horn stuffed with tow. The apex of the spike does not, however, appear to terminate in an orifice, but is closed.

It does not seem to me that this spike can serve as a balance to the cocoon, because the nests are usually attached to some kind of support; I may, however, mention that I cut off the spike from two of the cocoons, and in both these cases the eggs did not hatch; it is, however, possible this may have arisen from some other cause, although these particular cocoons appeared to be similar in every respect to others of which the eggs matured in due course. The cocoons from which the spikes were removed subsequently sank.

These nests are so constructed that when floating loose the spike retains its proper position uppermost, and even if the cocoon be held so that the spike is parallel with the water, and then suddenly released, it immediately rights itself; if, however, the spike be only partially submerged and then released, the cocoon turns bottom upwards.

The number of eggs contained in each nest is usually between 50 and 60; thus in four cocoons, of which I counted the larvæ when they emerged, the figures were respectively 53, 57, 56, and 57, or an average of 56. It will be observed how closely these figures approximate.

The egg-pouches made by *Hydrobius fuscipes* are very similar in substance and general appearance to those of *Hydrophilus piceus*, although far smaller, being about the size of a pea, flattened on one side, and are without any spike. I have found them very plentiful in April and May, attached to the under side of floating grass, their presence being indicated by the upper side of the grass leaves having small patches or streaks of white.

The spike noted in the cocoons of *H. piceus* is absent from those of *H. fuscipes*, its place being taken simply by the material of which the nest is composed, being continued from the under side of the grass leaf, round the edge, and then spread over the upper surface of the leaf. From their position these cocoons of *H. fuscipes* must be peculiarly liable to be submerged by the rising of the water through floods. I find, however, that the eggs in these pouches will hatch if kept entirely under water. Thus cocoons submerged on April 24th had, for the most part, hatched out by May 19th; there were, however, some of the nests which, on being opened out, were found to contain larvæ evidently alive, but not matured.

The larvæ appear to emerge, under ordinary circumstances, about ten to nineteen days after the cocoons are first made, but I expect the period varies according to the warmth of the water, and with other conditions.

I have, by opening various egg-pouches, had an opportunity of observing that the larvæ of *H. fuscipes* develop gradually, and are capable of motion some time before they are ready to emerge from the nest. The cocoons are also not water-tight, as there is always a considerable amount of moisture in the nests.

No doubt these cocoons serve as a protection to the larvæ, and as the individual eggs are not covered with any strong integument, and the process of development is gradual, the nest must act as a shelter to the young larvæ and preserve them from their enemies until they acquire sufficient activity to go in search of food.

4, Endwell Road, Brockley Rise, Brockley, Oct. 25, 1880.

PYRALIS LIENIGIALIS, ZELL.: A PYRALE ADDED TO
THE BRITISH FAUNA.

BY W. THOMPSON.

It is with great pleasure I have to record the addition of a new *Pyrale* to the British fauna. In August, 1879, I captured a moth at light, which I put aside for a dark variety of *Pyralis farinalis*. In August and September of last season I captured three others, also at light. Feeling convinced they were something new I sent a specimen to Mr. Barrett, who kindly wrote

that they were the *Asopia Lienigialis* of Zeller. Mr. Bryan, another collector here, has also captured several specimens; in each case at light.

183, Stantonbury, Stony Stratford, Bucks,
March 5, 1881.

[*Pyralis Lienigialis* of Zeller is closely allied to *P. farinalis*, and will follow immediately after that species in our collections. Dr. Wocke places it in the genus *Asopia*, and separates it from the latter species only by *A. domesticalis*, a species not yet recorded as British. Dr. Wocke, in his Catalogue (1871), records our new addition only from Livonia and Finland. —Ed.]

ENTOMOLOGICAL NOTES, CAPTURES, &c.

SILK-PRODUCING AND OTHER EXOTIC BOMBYCES.—Continuing my observations (Entom. xiii. 63) upon the open-air rearing of these insects in this country, I will begin by referring to *Attacus Luna*. I have been most successful in breeding this beautiful and delicately plumaged moth. On the 21st June last nine eggs hatched, resulting in five of the young larvæ attaining maturity and constructing cocoons between the 3rd and 13th of the following August. The larvæ were slieved to branches of walnut (*Juglans regia*), and protected from heavy rains by thin waterproof covering, and the cocoons were spun in the hollows which the larvæ had formed by ingeniously drawing together two or three leaves of the food-plant. The cocoons are equal in texture and size to those imported from America, the largest being nearly two inches in length, and one inch and a quarter in depth. The first imagines, a pair, emerged on the 5th September, measuring in expanse of wing, the male four inches and a half, and the female five inches, within half an inch of the maximum expanse of wing of the insect in its native state. The remainder, females, emerged on the 9th, and proved equally fine specimens. I noticed that the characteristic apple-green colour of the wings, as well as the purple-grey costal and thorax stripes, were of paler hues than that of imported specimens, but that the lunated spots on the fore, and the ocellated spots on the hinder, pair of wings were unusually clearly defined and brilliantly coloured. From the female, which emerged on the 5th September, 130 fertile eggs

were obtained between the 8th and 14th of the same month, and more might have been obtained had not the moth been killed to preserve for the cabinet. These eggs show signs of not hatching until next spring or summer, contrary to the nature of the insect in its North American habitat, where it passes the winter in the pupal state, having completed the cycle of its active existence within the months of June, July, and August. This abnormal condition may, in a measure, arise from the mildness of our autumn compared with that of North America, where winter sets in with much abruptness and severity, and where consequently the gradations between heat and cold are not so perceptible as in this climate. *Attacus Selene*.—I have not been so fortunate in rearing this transcendently lovely moth, the eggs of which hatched too late in the season—5th August—to ensure success in the open air. Three larvæ, however, out of four hatched, approached full growth, and one of which commenced on 10th October to form a cocoon, which it was never destined to complete. These larvæ were fed and protected similarly to those of *A. Luna*. The caterpillar is very beautiful, as indicated in my previous notes.—G. J. GRAPES; 2, Pownall Crescent, Colchester, Nov. 11, 1880.

FORGING PUPE.—I have had lately rather extensive experience on this subject, and have come to a decided conclusion that where practicable it is infinitely preferable to allowing nature to take her own course, at least as regards obtaining fine specimens at a time when setting-boards are comparatively empty, and entomologists are not working so hard as in the general season. In October of last year I was fortunate enough to procure about 25 pupæ of *Papilio Machaon*, several of common species, as *Pieris napi*, *P. rapæ*, &c., besides odd numbers of *Smerinthus populi* and *S. ocellatus*; I also had 12 foreign pupæ of *P. Podalirius*; all these I put in a breeding-cage exposed to the outer atmosphere, where I left them for a time, as I have found it indispensable that they should be first exposed to the frost. If your readers remember, we had some cold weather in the commencement of December, which I allowed the pupæ to have the benefit of, and afterwards removed the whole batch to one of the hottest houses on the nursery. The following is a record of the times when the chief number of the imagines emerged:—On Christmas Day three *P. Podalirius* came out, and shortly afterwards specimens of *Pieris napi* and *P. rapæ*; on January 4th, 7th, 21st, and

February 5th, all the other *P. Podalirius* emerged; *P. Machaon* first made an appearance on January 28th, and I have since had nine or ten more. As I write this a superb specimen of that noble butterfly is drying itself in the cage. *S. populi* and *S. ocellatus* appeared a few days ago, and I also bred three foreign examples of *Pieris Daplidice* all in magnificent condition. I think that I have said enough to show that where possible it is an immense advantage to force those Lepidoptera which hibernate in the pupa state. I have an idea that those which pass the shortest time in that state are less liable to failure at the time of emergence than chrysalides which are compelled to run a gauntlet of evils, such as becoming too dry or the reverse, for nine and sometimes ten months. Out of about 30 specimens bred by me this winter, I have had but one failure, which was a *P. Podalirius*, and that was rather an accident, as I found the imago on its back in a little water which was at the bottom of the breeding-cage vainly endeavouring to rise. As it turned out afterwards, one pair of wings reached their proper size, the others never grew at all.—B. PRITCHARD; Frankwell Nursery, Shrewsbury, February 8, 1881.

LARVA OF *CIDARIA FULVATA*.—I fear Mr. Gervase F. Mathew has made a mistake in his description of the supposed larva of *Cidaria fulvata*, in the March number of the 'Entomologist' (Entom. xiv. 67). Probably by the time the April number is out some imagos will have appeared from the larvæ described, and, if so, I have no doubt they will prove to be not *C. fulvata*, but *Anticlea badiata*, the different varieties of the larva of which Mr. Mathew has described. Years ago I fell into the same mistake myself, but fortunately waited for the appearance of the imagos before publishing description. I had beaten out these larvæ very freely at the beginning of June from wild rose bushes here, about which in July *C. fulvata* was always plentiful. I had no doubt whatever of their being that species, and as such described them in my note-book. Nor did I scarcely suspect the error when no imagos appeared in my cages in July, nor until the following spring, when I reared from them a splendid series of *Anticlea badiata*. Several years after I found the larva of *C. fulvata*, and a description of it will be found in the 'Entomologist's Monthly Magazine' for May, 1880.—GEO. T. PORRITT; Highroyd House, Huddersfield, March 2, 1881.

TENTHREDINIDÆ NEAR YORK. — The following notes and captures of Tenthredinidæ have been made by me during the seasons 1879 and 1880. I am, however, indebted to Messrs. Fitch and Bridgman for naming them. They will, therefore, be pleased to accept my sincere thanks for their kindness in so doing. — *Trichiosoma betuleti*, Kl. This species is perhaps scarcely worth recording on account of its general abundance, but it is nevertheless an interesting species, being one of our largest sawflies. It abounds in the larva state on the hawthorn hedges around here; its large size and white appearance render it a conspicuous object. It is one, therefore, which may be easily found by the hymenopterist. If we beat the hedges in August or September into an inverted umbrella, we shall be readily repaid by an abundance of the larva. When disturbed it rolls itself up on the under side of a leaf, and will remain quietly concealed there until the object of its alarm has gone. After feeding for four or five weeks it then commences to construct a dwelling for its winter quarters. It does not, like the larvæ of the lepidopterous group, roam about for a considerable time in search of a place where it may safely rest, but, being full-fed, it sets to work there and then on the same twig on which it had been feeding, and makes a strong oval, leathery cocoon, something similar to the cocoon of *Eriogaster lanestris*. In this home it remains until the following May or June as a contracted larva. It then changes to a pupa a few weeks before its emergence as a perfect fly. *Cræsus septentrionalis*, L., is not, I believe, a species of general occurrence, though where it does occur it is found in some abundance, from its being a gregarious feeder. It has visited this locality during the years 1879 and 1880. I noticed it upon alder, birch, and hazel in 1879, stripping the bushes; in 1880 I noticed it only on birch, but in greater numbers than in the previous year. It takes firmly hold of its food-leaf with its prolegs, and if in anywise disturbed it throws up its posterior segments in self-defence. Its colour is pale green, with conspicuous black subdorsal spots. When full-fed it descends into the earth and spins a brown tough cocoon, and remains there until the following June. The colour of the perfect fly is black, with a broad bright red band on the abdomen. *C. latipes*, Hart. — A smaller species belonging to the same genus as the last. I met with a dozen larvæ on some birches in a hedgerow in 1879. It

feeds much in the same way as the last, several larvæ together. These larvæ are brownish black, with the exception of the two last segments, which are yellowish. It has the same habit of throwing up its posterior segments when disturbed ; it also makes its cocoon in the earth. In the following year it is the first of the family to appear in the perfect state, being three weeks earlier than *C. septentrionalis*. The perfect fly is black, with a narrower band of red on the abdomen. *C. varus*, Hart. — This is another species of the same size as *C. septentrionalis*. I had the good fortune to meet with a number of larvæ in 1879, feeding upon some small alder trees in this neighbourhood ; they were of a darker green colour than *C. septentrionalis*, and without the black spots which are so prominent a feature in that species. Of our three species of *Cræsus*, all of which I have had the pleasure of rearing from larvæ, this is the last to appear in the perfect state. It began to emerge in July. *Cladius viminalis*, Fall.—I find the larvæ of this species under the leaves of the balsam and black poplars, seven or eight together. They rest during the day stretched along the under side of the leaf with all their heads together and their bodies touching one another. The colour of the larvæ is orange, with black heads, and some scattered black spots over the surface. When full-fed the larvæ made their cocoons between the gauze covering of the pot and the rim, indicating by this that the larvæ, in a state of nature, will make up in holes of the bark or dead branches which may be on the tree. *Tenthredo livida*, L., I have captured in its haunts ; it is a very lively insect. I find it amongst the tall rank herbage which grows luxuriantly along ditch sides. In such places *Heracleum sphondylium* and *Spiræa ulmaria* grow, and it is fond of settling on the leaves of these plants, or if disturbed it darts in among them, and is soon out of sight, whilst its quick movements make it very difficult to catch ; all the while its antennæ are vibrating quickly. Another distinct feature of this insect is, the tip of the antennæ are black, but the two joints preceding are white, and the remainder are black. *Tenthredo punctulata*, Kl., and *T. nassata*, L., are found in similar situations as the last. The former of these two is a quiet insect, and easily captured ; it will remain on the leaf or branch until you box it. It was common round here during 1880. *T. nassata* is a livelier insect. I took two examples in 1879, and might have taken more, but thought it was a common

species. I did not see any during 1880, though I looked for it several times. The larva of *T. punctulata* is greyish green, with oblique grey stripes on the sides, which meet on the dorsal line. When full-fed it changes to a dull pink colour, enters the earth for its winter quarters without making any cocoon. *Tenthredo gibbosa*, Fall., *T. mesomela*, L., and *T. atra*, L., I have captured in this locality; of *T. gibbosa* I took two specimens, and one each of the others. *Emphytus cinctus*, L., I find amongst briars. I have also taken two examples of *Emphytus perla*, Kl., which, Mr. Bridgman says, is very rare. I do not remember where I got them, but think I beat the larvæ out with others, as I found them in my room. *Allantus arcuatus*, Forst., and *A. tricinatus*, Fab., I found on the umbels of *Heracleum sphondylium*, six specimens of the first and three of the second, in 1879. *Eriocampa ovata*, L., two examples amongst alders in June; *Pachyprotasis rapæ*, L., two examples; *Nematus capræ*, Panz., *N. miliaris*, Panz., and *N. bilineatus*, Kl., bred five specimens of each, but did not take sufficient care to separate them so as to know their respective larvæ; *Hemichroa alni*, L., and *Selandria serva*, Fab., three specimens; also two specimens of what I take to be *Selandria flavescens*, Kl.; *Dolerus cenchris*, Hart., four specimens amongst nettles; *D. palustris*, Kl., and *D. gonager*, Fab., one each. *Monophadnus nigerrimus*, Kl., one example. *Athalia rosæ*, L., two; also three specimens of *Nematus myosotidis*, Fab. *Nematus viminalis*, L.—This interesting and possibly compound species lives, during its larval existence, in pea-shaped and round galls mainly on the under side of leaves of willows. I have met with it in this locality on two or three bushes, the two different shaped galls being on bushes very near each other. Whether the bushes on which both galls were found are one species of willow, or two distinct species, I cannot exactly say; only this appears to be certain, that the same insect is produced from both. The perfect insect is black, with the legs and generative organs dull yellow; the stigma is pale grey, with a black line on its inner side. *Lyda flaviventris*, Retz. (= *clypeata*, Klug.)—I was fortunate in obtaining a specimen of this species during the summer of 1879 amongst young currant trees. It was seated on one of the lower leaves, and not having seen the species before, I speedily boxed it. It is unnecessary for me to say more about it, as there is an excellent translation of Vollenhoven's life-history at Entom xii.,

pp. 101—106. *Nematus ribesii* I omitted above on account of its commonness. It has, however, been abundant here during the past year. Various means have been adopted to get rid of this pest, such as quicklime, hellebore powder, &c., but of no avail; it is there again the following year. We have, however, two distinct species here feeding on gooseberries. The larva of *N. ribesii* is pale or whitish green, with numerous black spots over the surface; also larger than the other I have mentioned. The other is dark green, scarcely distinguishable from the dark green of the gooseberry leaf, and on close examination you can see small black spots on the surface. This species, during the past season, has been more destructive than *N. ribesii*, stripping whole rows of trees, and causing them to present a picture of leafless winter-like trees. The quantity of trees stripped by both species covered more than an acre of ground. — T. WILSON; Holgate, York, January 7, 1881.

ANCHOMENUS MARGINATUS, L.—I was rather surprised to see the note on *Anchomenus marginatus*, L., in the March number of the 'Entomologist' (Entom. xiv. 70), stating that it was usually considered exclusively a coast insect, especially as it was backed by such authorities. All my specimens of this insect came from the banks of the Trent, near Repton, in Derbyshire. I have also seen it on the banks of the Dove, near Burton-on-Trent; and last August I came across a specimen near Newark-on-Trent. Of course one does not expect to find the actual fore-shore beetles—like *Philonthus xantholoma*, *Cillemum laterale*, &c., which we, as a rule, actually find in shingle or under seaweed—in inland situations; but the habitat of the semi-coast beetles, if we may so call them,—the beetles that inhabit the sandhills, and the part of the shore beyond the reach of the tide,—must be taken with great reserve. I remember being much surprised at finding a *Brosicus cephalotes* some eight or nine miles from the coast; but Dawson (Geod. Brit., p. 114) records this species from Woburn, in Bedfordshire. Compared with the fauna of large continents like Asia or America, our island may be considered as entirely consisting of coast, and therefore we must be very careful in speaking too strictly of coast or inland fauna. Botanists will tell us the same thing: many maritime plants are found flourishing at great distances from the sea, owing to deposits of salt and other circumstances; and there is no reason why the fauna should not

be affected by these as well as the flora. A series of careful observations regarding the distribution and consequent variation of our indigenous insects would not only be very interesting, but extremely useful to science. The importance of such observations has been well shown by Mr. Wallace in his last book, 'Island Life.' Entomology is far too apt to degenerate into mere collecting; and any note, however trivial, that brings out a fact with regard to the structure, habits, or localities of insects, is far preferable to any note that simply records the capture of a rare species that has very probably been blown over from the Continent, interesting though these communications may often be.—W. W. FOWLER; Lincoln.

[I have myself always been accustomed to consider *Anchomenus marginatus* as a very common inland insect, having met with it frequently and in abundance.—J. A. P.]

STRANGALIA QUADRIFASCIATA AT WEST WICKHAM.—Last August I took this beetle, together with *S. armata*, at West Wickham. I send you this note as, besides the rarity of the insect, I believe it has not been noticed in the neighbourhood of London before.—A. SIDNEY OLLIFF; 36, Mornington Road, Regent's Park, March 7, 1881.

ECONOMY AND PARASITE OF A MYCETOPHILID.—Last May Mrs. Hutchinson sent me, from Herefordshire, a piece of a boletus, growing on a pear tree, with some small pupæ enclosed in a white silken web. In June I was successful in rearing from them a pair of *Lasiosoma (Sciophila) lutea*, Macq., and also a pair of its parasite, which Mr. Bridgman considers to be Holmgren's *Orthocentrus corrugator*.—C. W. DALE; Glanville's Wootton, Sherborne, Dorset.

ENTOMOLOGICAL NOMENCLATURE.—Mr. Briggs's remarks on the name "*Blancheata*" (Entom. xiv. 71) appear inexplicable, except on the supposition that he wished to name the species himself. The first discoverer of a species is clearly entitled to give it any new name he chooses, and Mr. Cooke (Entom. xiv. 43) is perfectly within his rights in naming the species *Blancheata*, and he is no more bound to concoct a name out of a dictionary than he is to follow the absurd example of Linné, and name it after mythological people who never existed, the more so as the greater majority of English entomologists do not understand Greek and Latin. In

any other than the present case it might have been a questionable compliment to call a "pug" after a lady, but not in this, as all must admit.—CHARLES CLIFFORD; Corporation Street, Manchester, March 10, 1881.

REVIEWS.

Les parasites et les Maladies parasitaires. By P. MÉGNIN. Paris : G. Masson. 1880.

THIS work treats of the parasitic diseases to which man and the domestic or wild animals are liable, and of those insects which produce them. The parasites of ourselves and our animals we all know are very numerous and very diverse; their attacks are often serious, and certainly their presence is at all times unpleasant. Though always specially noted by medical and veterinary practitioners, even generally by casual observers, it is astonishing how little is really known of them in this country. We welcomed the late Mr. Murray's 'Aptera' (Entom. x. 102) as a useful *résumé*, and much wanted manual of our despised lice, ticks, and mites; M. Mégnin's comprehensive volume we now heartily commend to the notice of all students, whether medical, veterinary, agricultural, or entomological. The present volume only treats of the parasitic *Articulata*, but it appears that a further work, treating of those lower in the scale and the cryptogams, is in preparation. M. Mégnin's first words define a parasite as a being living at the expense of other living beings. This will show the wide ground covered by this volume—the external and internal parasites of animals. The numerous parasitic Diptera, and the *Pulicidæ*, still retained in Kirby's order Aphaniptera; our well-known hemipteron (*Acanthia* or *Cimex*); the numerous *Pediculina* and *Mallophaga*; a single new Collembola, belonging to the *Poduridæ*, which our author tells us is a veritable stable-louse; and that abnormal coleopteron (*Platypsylla castoris*)—the Canadian beaver-parasite (figured, Entom. vii. 294)—are all fully treated of in both systematic and economic detail. Their history occupies 104 pages. The following 336 pages are devoted to the special families of the *Acaridæ*, amongst which M. Mégnin has long been known as one of the highest authorities. Particularly clear and comparative descriptions of the closely-allied species are given,

and their metamorphoses, physiology, and "action nocive" are fully treated of; the nosography, etiology, diagnosis, prognosis, and treatment of the various parasitic diseases—in fact their special pathology is also fully set forth. The crustacean parasites of our marine animals are less exhaustively handled in the concluding sixteen pages,

Many pieces of information we should like to cull from this book, and we are sure they would be interesting and instructive to our readers; but, as we have said, it should be consulted by a variety of workers; as far as present information goes it will not be found wanting. Its value is greatly increased by the illustrations. There are sixty-three woodcuts, very nearly all from the author's beautiful drawings, and twenty-six plates, also drawn and lithographed by himself. We must, however, protest against the continental—especially French—method of publishing the plates and text in separate parts and wrappers; in the present instance the plates are nearly half an inch each way larger than the letter-press, which is demy octavo, so that it is quite impossible that the volume can be bound. The price of the work complete is about seventeen shillings.—E. A. F.

Biologie der Käfer Europas. By MATHIAS RUPERTSBERGER.
Linz a. d. Donau. 1880.

ENTOMOLOGICAL literature is now becoming so voluminous, and is so scattered, that judicious and concise cataloguing is one of the best works that can be performed in the interest of the working naturalist. Herr Rupertsberger has just completed such a guide in his '*Biologie der Käfer Europas.*' This is an unpretentious volume of but just over 300 demy 8vo pages, but it will prove one of the greatest value to the working coleopterist, and more especially to the general field naturalist. When an insect belonging to any order is bred by the general entomologist, much valuable information is often lost to science from the mere fact of the great difficulty of ascertaining whether the observations made have been previously recorded. This remark is especially applicable to the Coleoptera, about whose economy so little is known in this country; many species are met with in the larval state and their life-history noted, but the uncertainty of whether the observations are new or not delays publication. Rupertsberger's valuable compilation will at once refer us to our

present knowledge of the economy of any given species. After a short introduction and a list of the full titles of the periodical literature cited, we have in this work, firstly, the full record of the works and publications in which the biological literature appeared under the authors' names in alphabetical order; secondly, a systematic arrangement under the respective families, genera, and species; concluding with a catalogue of all known coleopterous larvæ, with the name of the describer, and the date of publication. There is also a good index to the genera. We have verified many of the numerous references and found but one slight error; the omissa also appear to be remarkably few, though doubtless there are some. Not only have our scientific publications been overhauled, but all our 'Gardener's Chronicle,' 'Royal Agricultural Society's Journal,' 'Loudon's Magazine' and 'Arboretum' references are included, as well as the numerous American observations on European species. Altogether nearly 700 authors are quoted, and their various publications are more than double that number. In the 'Larven-Catalog' English names are remarkably few and far between, showing that our discoveries in beetle biology have been comparatively very meagre; Mulsant, Perris, and Schioedte show remarkably well.

The 'Catalogue des Larves des Coléoptères,' by M. F. Chapuis et M. E. Candèze (Mém. de la Soc. royal des Sciences de Liège, viii., 341—653, 9 plain plates, 1853); Dr. K. Letzner's articles in the Breslau 'Zeitschrift für Entomologie' (vol. ix., pp. 1—17, Coleop., 1855); and Dr. Hagen's work in his invaluable 'Bibliotheca Entomologica,' Sach-register iii., 67 (vol. ii., pp. 440—1), with his further "Zusatz zu den von Chapuis und Candèze aufgeführten Larven von Coleopteren" in the Stettin 'Entomologische Zeitung' (vol. xxiv., pp. 298—309), were the bases on which Rupertsberger had to build, and the superstructure has proved itself well worthy of such foundations. He has built a suitable house, well fitted. May it be frequently used by all working entomologists, and then the pages of our own 'Zoological Record,' and of Carus' 'Zoologischer Anzeiger,' and his 'Zoologischer Jahresbericht' will contain more frequent biological references under "Coleoptera" than hitherto. This will soon necessitate new wings to Rupertsberger's compact house—a supplement to the then well known reference-book now under consideration.—E. A. F.

OBITUARY.

WALTER PHILIP WESTON.—By the early death of Mr. Walter Philip Weston (Entom. xiv. 72) a large number of the readers of the 'Entomologist' have lost a genial friend in one who was always willing to assist his brother naturalists either with information from the large store of knowledge he had accumulated or with specimens which he liberally distributed. Mr. Weston had from his childhood been attached to the study of Entomology; and although most of his attention was devoted to Lepidoptera, the other orders, particularly Coleoptera (of which he possessed a good collection), were not neglected. His favourite group of Lepidoptera was the Tortrices, and his collection of them is very complete. Whilst solving the problem of the identity of *Ephippiphora gallicolana* and *E. obscurana* (Entom. xi. 237) he made many interesting observations concerning the insects inhabiting oak-galls; and Mr. Bridgman named one of the new Ichneumons bred by him, *Cecidonomus Westoni*. As a practical collector Mr. Weston was most successful, but at the same time he endeavoured to attain scientific results from his work, and that he succeeded in doing so the pages of the 'Entomologist' bear ample testimony. Amongst the periodicals to which he contributed may be mentioned the 'Athenæum.' Had he lived there is no doubt but that science would have much benefited from his untiring energy and power of observation. In September, 1879, Mr. Weston married a daughter of Dr. Birch, keeper of oriental antiquities, British Museum, who survives to mourn his loss.—ED.

ROBERT HIND.—Mr. Hind died at York, March 11th, 1881, aged sixty-one years. About quarter of a century ago Mr. Hind did much, in an unostentatious manner, to encourage and revive Entomology in Yorkshire. At his home in Gillygate, York, was established the York Entomological Society, which became a pleasant réunion of those interested in the subject. Chiefly on account of ill-health he has not latterly given much attention to collecting. He had, however, considerable success as a rearer of Micro-lepidoptera. It was he who first obtained in this country *Melissoblaptēs Cephalonica*, a species which has rarely, if ever, been obtained since.—ED.

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NOTES ON THE LEPIDOPTERA-RHOPALOCERA OF HUDSON'S BAY.

By J. JENNER WEIR, F.L.S., F.Z.S.

MR. WALTON HAYDON, a surgeon in the service of the Hudson's Bay Company, has been so kind as to send me the results of two years' entomological collecting in this very dreary region.

Mr. Haydon is stationed at Moose Factory, on an island at the south-western side of St. James' Bay, the most southern arm of Hudson's Bay, situated in long. $80^{\circ} 56'$, lat. $50^{\circ} 20'$, thus being about 3000 miles due west of London. The trees of the district are chiefly pine, birch, and willow, with currant and gooseberry bushes; the country is marshy. The winter is very long, lasting seven months, during five of which the thermometer does not rise above freezing, and sometimes sinking to -52° F. Mr. Haydon has sent me the observed mean temperature for eleven months of the year, according to Fahrenheit, viz.: January $-4^{\circ} 2'$; February $-6^{\circ} 6'$; March $+11^{\circ} 8'$; April $+24^{\circ} 7'$; May $+40^{\circ} 6'$; June $+51^{\circ} 0'$; July $+60^{\circ} 3'$; August $+58^{\circ} 5'$; October $+38^{\circ} 0'$; November $+25^{\circ} 0'$; December $+7^{\circ} 8'$. It will be seen that, although Moose is within a few minutes in the same latitude as London, the climate is very much colder, the winter longer, and the summer shorter.

Ordinary vegetables do not come to perfection; for instance, Mr. Haydon informs me that his peas grew to the height of ten feet, but produced no pods; and on July 16th, 1880, the potatoes were but four inches above the ground. At least thirty Indians had died of starvation during the winter of 1879-80.

In so dismal a country such creatures of the sun as butterflies could scarcely be expected to exist, but seventeen species have been transmitted, belonging to ten genera. Of the genera all but one are British; of the species three are British, eight are closely allied to British species, four have European allies, one alone presents an American type of an European genus, and one is of a purely American genus.

The British species are as follows, viz.:—

Vanessa Antiopa, Linn.—Differs only in the buff border being more irrorated with black dots than any British or European specimens I have seen. Appears in July, August, and September.

Pyrameis cardui, Linn.—This cosmopolitan insect presents not the slightest difference from the normal form. Appears from July to September.

Pyrameis Atalanta, Linn.—The only difference I can detect is that the white spots in the upper wings are slightly smaller than in British specimens. Captured in July and August.

The eight species more or less closely allied to British species are as follows, viz.:—

Pieris oleracea, Harr.—Closely resembles *P. napi*, but paler in colour, and the upper side of the wings spotless, as is the case in the male spring variety of the latter. Appears end of May, June, and July.

Argynnis Atlantis, Edwards.—A much darker insect than *A. Adippe*, one of its nearest British allies, with a broader dark band around the edges of the wings, and the under side of the lower wings with a chocolate ground colour.

Argynnis Myrina, Cram.—Very close to *A. Selene*, but, as in the last species, the under side of the wings is of a darker chocolate colour, and the silver spots are more distinct.

Vanessa Milberti, Godt.—Very closely allied to *V. urticae*; it differs in being darker, without the row of blue spots near the edges of the wings, the two small spots on the upper wings of *V. urticae*, are also absent; the central black spot on the costa joins that on the lower edge of the wing, thus forming a fascia, as is occasionally found in the latter species. The species flies early. The specimen sent was taken on May 14th, 1879.

Grapta Faunus, Edwards, and *Grapta gracilis*, Grote & Robinson.—Can only with difficulty be distinguished from each

other, or from *Grapta C-Album*, Linn. The former species was captured in May; the latter in June, July, and August.

Lycæna Lucia, Kirby.—This species reminds me very much of our *L. argiolus*, and would appear also to be double-brooded, one of the specimens having been captured as early as June 13th, and another as late as September.

Colias Eurytheme, var.

Colias Keewaydin, Edwards.—Can scarcely be distinguished from our well-known *Colias Edusa*. The specimens sent me were taken in August and September.

The four species belonging to British genera, which have no near allies in these islands, but are represented on the Continent, are as follows, viz. :—

Argynnis Lapponica, Esp., and *A. Tarquinius*, Curt.—The Hudson's Bay form of the first species differs in no way from the European; and the second may probably be only a geographical variety, hardly differentiated sufficiently to be termed a distinct species. They appear in June.

Argynnis Bellona, Fabr.—In the shape of its upper wings, which are long and narrow, this is much further removed from the European species of the genus *Argynnis* than any of those above mentioned: it has a peculiar vinous-coloured under side to the secondary wings, and the silver spots are quite absent.

Papilio Glaucus, Linn., var. *Turnus*, Linn.—In Europe this fine species is represented by *P. Alexanor*, which it much resembles; it is also very like *P. Podalirius*. In July it is found commonly by Mr. Haydon; but the melanic variety, the true *P. Glaucus*, does not seem to occur.

The American type of an European genus is *Limenitis Artemis*, Drury, var. *lamina*, Fab.; the only European species which this approaches is *L. populi*. This latter species appears to stand midway between such European species as *L. Sibylla*, Linn., *L. Camilla*, Wien. Verz., and the American form assumed by the genus on that Continent. The four specimens received very closely resemble in both sexes Edwards' figures of *L. lamina*, Fab., in the second volume of the 'Butterflies of North America.'

All the species dealt with I regard as Arctic or Sub-Arctic forms, standing on the same footing as the Arctic birds, and to

which the zoological division into Palearctic and Nearctic regions does not apply.

The purely American genus, *Phyciodes*, is not represented in any part of the Palearctic zoological region; the highest development of the group has been obtained in the Neo-tropical zoological region, from which the species of the genus inhabiting North America have been probably derived.

The only species received from Hudson's Bay is *Phyciodes Tharos*, Drury. It appears during the months of July and August. The thirteen specimens sent do not differ very much in colour or markings, except that some are darker than others; and in two specimens there is a wavy line running through the black band at the lower edge of the upper side of the secondary wings. The insect is very plentiful in the district.

The collection, of which I have now given a description, small as it is, is not wanting in interest. It is surprising to contemplate the time which must have elapsed since the three identical with European species had a common ancestor, and yet the difference now existing is too slight to consider them even varieties of each other. A former connection with Europe by the Farøe Islands, Iceland, and Greenland, no doubt existed, and during one of the periods of mild Arctic climate the transmission of species from one continent to another was effected. We are so in the habit of calling this hemisphere the Old World, that it does not occur to us that it is just as likely that *Vanessa Antiopa* passed from America to Europe, as that the converse was the case.

To Mr. Walton Haydon my thanks are due for having furnished me with the material used in the preparation of these notes.

6, Haddo Villas, Blackheath, S.E.

BUTTERFLY HUNTING IN NATAL: ON THE COAST-LANDS.

By WILLIAM D. GOOCH, C.E.

(Continued from p. 66.)

THE very close resemblance of these three insects, *Danaïs Echeria*, *Pseudacraea Tarquinia*, and *Acræa Aganice*, as they circled and swooped in the lazy luxury of intense sunlight, was most acutely watched by the veteran, who found difficulty in

identifying the two latter insects from one another, although not so much so in separating *D. Echeria*. The latter has a Danaidine movement, every now and then, of its wings, a sort of flutter which the other two did not give, but the general tone of the colouring, the flight, and their association, lead even an educated eye astray. The congener of *P. Tarquinia*, *P. Boisduvalii*, perhaps the most richly-coloured insect of our coast, is equally deceptive, being closely allied superficially to *Acræa Zetes*, var. *Acara*; I have seen them on the wing together, and the most intense watching did not enable me to distinguish them. *P. Tarquinia* I always tell at once from *A. Aganice*, perhaps being more used to him, as he was always to be found at "my corner." We next add, on this spot, *Junonia Natalica*, *Terias Brigitta*, with the bright yellow, *Pieris Agathina*, two or three specimens showing the different ranges of yellow and orange in its colouring. *Atella Phalanta* visits its food-plant in plenty, and several deeply-marked specimens (it is the wet season brood) are secured. Although tempted to linger here by the ever-changing fauna, having a long stretch yet before us, we leave the crown of the hill and go into the unkempt fruit-garden, through which we are to gain the bush path.

The first step we make into the fallen orange leaves and fruit, which cover the ground, disturbs innumerable individuals of the very interesting moth, *Achæa Chameleon*. They are settled on the fallen and half-decayed fruit—guavas, oranges, lemons, sour-sops—which litter the ground, and are avidly sucking the juices that remain in it. The veteran who has not seen a similar phenomenon to the same extent before, commences a raid on them, and exclaims with delight at the diversity of each specimen from the previous. I remind him that butterflies are our object, and we must move on; ten minutes, however, has given us to the two nets thirty picked specimens, which quite serve to indicate the *Chameleon* variety of forms of this moth. Its appearance in such abundance this season is very remarkable, the more so that—although the larvæ must be large conspicuous grubs, and I have been collecting everywhere for the last three months—I have not seen a single specimen of it, although the imago is now out in myriads.

Amongst the moths, and holding their own as they best can, we capture, somewhat surfeited with their fruity repast, two

females of *Papilio Merope*, one the *Cenea* type, the other the yellow one; *Charaxes Ethalion*, females also; *C. Cithæron*, both sexes; and several *Crenis Natalensis*. These are all more attentive to the decaying guavas, perhaps on account of their stronger flavour, than to any other of the fallen fruits. In the sun also, round a *loquat* in bloom, we take, for the first time, although we have seen them before, the two gorgeous day-moths, *Glaucopis Formosa*, with its sheen of gold and silver and bands of purple and red, and *G. Madagascariensis*, with its rich black and crimson bands and marks. As we leave the corner of this old garden, and enter the thicket skirting the big bush which we are going to cross, we find several specimens of the larvæ of the clear-wing humming-bird moth, *Hemaris Hylas*, which are very variable; and on the food-plant, which has large green shiny leaves and clusters of red bell-shaped flowers, we watch a female depositing her eggs, singly, on the surface of the leaf, selecting always quite fresh opened young leaves on a central axil of the plant.

Eurytela Hiarbas, *C. Cleodora*, *Acræa Natalica*, *Junonia Clelia*, *Philognoma Varanes*, several *Pieridæ*, a damaged *P. Merope*, *A. Phalanta*, are all added here, as well as a few skippers, *Pamphila Mohopaani*, *P. mackenii*, *Nisoniades Djælælæ*, *Pyrgus vindex*.

The veteran, before entering the bush, quite bears me out in my penchant for this little bit of hunting ground, upon which, not an acre in extent, I have taken over one hundred varieties of butterflies in one season. Its aspect, compactness, and availability was borne in mind whenever he visited me afterwards; when missing I always sent for him to "my corner."

For the next half-mile our path is thence a track which I have cut with a bush-knife, rather tortuous, and very narrow, partly to get to the boles of the large iron-wood, mahogany, flat-crown, and fig trees, for sugaring purposes at night, and partly to work a way to the hill-top on the other side of the valley, which is the favourite haunt of *P. Menestheus* (*Ophidocephalus*?)

Pushing along, now and then barred by a fallen trunk or a thorny liana, we reach an open glade of rank grass, and liliaceous plants and trees with mossy boughs, on which a few parasitic orchids are just over bloom; on the edge of this, being on the alert, the Satyrid, *Gnophodes Parmeno*, is marked down, and, after a very cautious approach and quick plunge, captured ere he can rise

from the bed of fallen leaves on which he had settled, protected, to any but the best-trained eye, by his under wings of marvellous tracery of greys and browns. Here also the sweet little diaphanous *Pontia Alcesta* is taken, three specimens, slowly flitting through the complicated network of interlacing branches, and much easier to see than to obtain; and a little Satyrid, sporting pretty freely, is added, but one which we have already made acquaintance with on the edge of the bush, and on our path down to this glade. A large wood tiger moth also captured, although in bad condition, is interesting, because, as a female, it has a curved horny appendage at the tail which has puzzled me much to explain. I have bred the moth from larvæ taken in the same bush, but they were leaf-feeders, and so, if the appendage is an ovipositor, it is difficult to indicate its object; it is true I have never worked out the life-history, and, as the veteran suggests, it may pass the first weeks of its existence in the larval state under or in the bark of the food-plant.

Following the valley bottom downwards, although we have no great success in hunting, we have cool walking, and by the time we arrive at the high road, which we have to cross, we are cooled down, and have forgotten the intense blaze of the sunlight we have yet to experience.

The Natal bush is not very striking; the underscrub and thicket is so dense, that even when, as occurs now and then throughout it, a patch of really grand trees is found, you have a great difficulty in making out their size or beauty. Here and there, chiefly on the damper slopes, the undergrowth is less, and you are able to see fifty to one hundred yards, and appreciate the density of the growth and real size of the trees; and elsewhere some giant fig, battenning on its victims, and still grasping the decayed remnants in its contorted stems, sweeps over a large area, and by its deadly shade seems to kill off the surrounding trees, to stand majestic amidst their destruction, and leave an open space below and round it.

The fig trees are full of holes, and in them a large Erebus moth, *Patula Macrops*, takes refuge, and, when poked out by a stick, flops out, like a bat, in a sulky, dodgy, and bewildering way, which renders him anything but an easy victim to the entomologist, the more so that, immediately upon his emergence, he dashes straight at your face on a tour of inspection. Bees

also, and very large hornets, to say nothing of snakes, sometimes emerge from these holes instead of Erebus, and lend anything but a pleasing source of diversion to the operation.

The high road, when reached, although dusty, has one side of it lined by a labiate flower in full bloom, and here we first meet with the Hesperid, *Ismene Florestan*, and its var. *Valmaran*? They are charming insects to make acquaintance with, and are numerous. Poised at the flower-bells, with the bright white bar vibrating on the hind wing, if cautiously approached, they are not difficult of capture, and the veteran is soon pleasantly occupied, adding also *Callidryas Florella*, *Eronia Leda*, *E. Cleodora*, and a female *Anthocharis Ione*, who all come dipping along, with a hover from flower to flower, to sip and be off again. Whilst he is at work I stroll up to a bridge where a watercourse crosses the road, a favourite spot of *Papilio Pylades*, and, as he is there, I fetch up the veteran for a try; but *Pylades*, circling and settling, three of them, on the other side of the water, at an inconvenient height, are too well occupied flirting with each other to bestow any attention upon us. We try the long rod, but vote them "sour grapes," and return to our bush-path.

Leaving the road, a few steps carries us through a patch of castor-oil and dhol, the remnant of an old coolie garden, to a crossing lower down on the stream I have just mentioned, and, on a patch of damp sand in the sedgy current, sit two *Papilio Policenes*, drinking the moisture, whilst their delicate tails keep up a continuous quivering motion; with them are a school of "whites." In quietly approaching we put up the whites, which startle *Policenes*, and they are off before we can take them. On the margin of this stream, and at the edge of the old coolie ground, we find a sort of yellow laburnum shrub with several larvæ of the orange tiger moth, *Hypercompa Bellatrix*, on it, and in the course of our ascent of the opposite hill we take several specimens, freshly emerged, of the imago of that species. The next ten minutes is a scramble up a narrow path made by the Kafirs and Bush-buck conjointly, which in the very nature of things is not a happy hunting-ground; but it leads to the open glades of Kafir-Boom and Flat-crown, which are the special habitat of *Papilio Menestheus* and *P. Merope* in this country side, and to reach which has been the aim of our excursion in this direction.

Before commencing operations on *Menestheus*, we determine,

as we have been long on the road,—it is past one,—to sit down and collect our forces, pin up and arrange captures, and finally see what is in the basket. Knowing that if the veteran once gets his eye on *Menestheus* he will be off, I select a nook where I never recollect to have seen him, and so manage to have a quiet quarter of an hour to refresh; undisturbed by any frantic dashes on the part of the veteran, who, as it is, can barely be restrained from plunging after the numerous *P. Merope* individuals that give us a call on their rambles. Whilst sitting there lunching I call my friend's attention to several flies, as he thinks them, but which I know to be "clear-wings," settled on the herbage about, and at times found abundantly in the glade. We box off several for closer inspection; I do not know their names, but they are not rarities.

(To be continued.)

LIFE-HISTORIES OF SAWFLIES,

Translated from the Dutch of the late DR. S. C. SNELLEN VAN VOLLINGHOVEN.

BY J. W. MAY.

(Continued from p. 35.)

SELANDRIA CANDIDATA, Fall. (= *Repanda*, Kl.)

Imago: Fallen, 'Acta Holm,' 1807, 105, 45. Hartig, 'Blatt-und Holzwespen,' p. 279, No. 45. Thomson, 'Hymen, Scand., i., p. 230, No. 3.

The larva appears to be undescribed.

Selandria nigra, nitida, prothoracis limbo, squamulis et marginibus segmentorum abdominalium albis; maculis transversis in abdominis dorso cinereis, ore, orbitis, stigmatibus et pedum maxima parte subtestaceis. Long. 6 mm.

Several years ago Professor Westwood sent me from Oxford a yellow *Tenthredo* larva contained in a quill, describing it in a letter as the rascal which every year bored into his rose trees, adding that he had not hitherto been able to rear the insect; he asked me, of course, whether I was acquainted with the insect, to which query I was obliged to reply in the negative, but I undertook to investigate the matter, if possible; unfortunately, the larva I received was in such a sorry condition that there was no prospect of rearing it.

In my garden at Leyden I had, among other roses, a particularly fine French rose bush, one of the shoots of which I had observed to be bent and withered in the manner described to me; in fact, I should not be surprised if I had directed Professor Westwood's attention to it on the occasion of one of his visits, and that this may have led to his sending me the larva in question; however, it was so long ago that I cannot be certain on this point; anyhow, I examined my rose bush from time to time, and in June, 1865, I found, not only on the said rose bush, but also on others, several damaged shoots. I found one on the 1st of that month, and put it into spirits; on the 8th and 10th I put some of the twigs into some mould in a bottle, as I had found in the garden several twigs which had evidently been bored into, and from which the larvæ had disappeared, so that I concluded they changed to the pupa state in the ground, and not, like *Emphytus cinctus*, within the shoot.

Of one of these larvæ I made a drawing (fig. 3), and I at the same time made a sketch of the twig, as it was bent round, by which the habitat of the insect can be recognised (fig. 1a.) The shoot, after being distorted in this way, ceases to grow, and withers. The larva was moderately thick, and of a sordid yellow colour, somewhat clearer as to the anterior three segments, the alimentary canal appearing of a brownish colour, as seen through the skin. So far as I could make out, I observed twenty legs; the abdominal legs were, however, remarkably short, or else they were always too much drawn up into the skin. The head was smooth and globular, ochreous yellow in colour, the mandibles being ochre-brown; the palpi below the eyes were moderately long, the eyes themselves being inserted in round dark grey, almost black, spots.

The stigmata were very oblong, elliptic, and had grey borders. I failed to observe any hairs on any part of the body, and the claws of the thoracic legs were white, not brown, as is usually the case. At figure 2 I have represented this larva head downwards, as it attempts to conceal itself in a rose twig, which it had hollowed out, and which I tore open from the top, but I am entirely unacquainted with the earlier stages of its growth. I once, some years ago, received from Mr. Ver Loren a little yellow *Tenthredo* larva, which had been found in the rolled-up edge of a rose leaf; the agreement in colour and appearance, and also the

tendency to live in concealment common to both, make me suppose that this little larva may represent a very early stage of the larger one.

When the larva is full grown it leaves its dwelling, and goes into the ground, where it forms a blunt oval cocoon of particles of sand and mould spun together; this takes place in the beginning of June, and in this cocoon the larva remains without change until the spring, somewhat bent, with the head downward; I found the larva in this state on opening one of the cocoons in the winter. In consequence of the larva remaining so long without change, and of my having so few examples, I had no opportunity of observing the pupa, and so I have been prevented from giving a figure of the insect in this state. I was afraid of opening the cocoons one after the other, as by so doing I should kill them, for it very seldom happens that the larva survives this treatment. I cannot account for my not having noticed the insect moving about in the glass, but the only imago which I succeeded in rearing was found dead, lying on the mould; it was a female of *Selandria candidata* of Fallen, Klug's *S. repanda*, which seems to be a rather scarce insect everywhere.

As my observations of this insect were so incomplete—I was unacquainted with the pupa and the male—I resolved to wait until I might have an opportunity of continuing my researches. I have, however, not been fortunate enough to meet with the larva again, and although for several years I made plans to go over to Noordwijk in the beginning of June to examine the roses in the botanical gardens at that place, I was only able to get there once, and the result was *nil*. I also made enquiry, through an acquaintance, of one of the large growers there, but with the same result. Under these circumstances, I determined not to wait any longer in the hope of becoming better acquainted with the life-history of this species, but to publish what I knew on the subject. *Selandria candidata* belongs to a small group which Thomson separates as a genus, under the name of *Pæcilosoma*, one of its principal characteristics being the variegated colouring of the abdomen, or, at all events, the occurrence of transverse marks or bands on that part of the body. For myself, I am opposed to founding divisions on such trivial characters, but I fear the docility of entomologists is such that this little genus will be accepted as so many others have been.

The head is short and broad, but slightly shining, the front and face with many folds and impressions, without hair. The eyes are brown, oval, and moderately protuberant. The antennæ are inserted low down on the face: they are but little longer than the thorax, and consist of nine joints, of which the third is the longest, and the ninth the narrowest. The trophi are white, except the base of the mandibles, which is grey; the labrum is of a paler white than the clypeus, which has a yellowish tint. The maxillæ and the broad posterior margin of the eyes are sordid white. The thorax is shining, and covered with very short hairs; the upper border of the prothorax and the tegulæ are white; the wings are transparent, iridescent, but a little clouded, the costa and the stigma being white with a tinge of brown. In the second submarginal cell is a horny spot; the anterior portion of the anal cell (*area lanceolata*) has a very oblique transverse nervure, the under wings have no middle cell. In my example the sides of the breast have on each side a small round white spot.

The abdomen, which is rather broad and flat, has the posterior margins of the segment very finely bordered with white, and, in addition, on the 2nd, 3rd, 4th, and 5th segments, on either side of the dorsum, bluish grey transverse bands interrupted in the middle, which may, I think, consist of a covering of very short fine hairs. The ovipositor protrudes but little.

The legs are of the ordinary form, rather slender than robust. The basis of the coxæ and the larger part of the femora are bronze-black; the apical half of the coxæ, the trochanters, the knees, the tibiæ, except the apical half, which is brown, and the basis of the tarsi are sordid white; the remaining portion of the tarsi is brown. The claws on the last joint are double. As I mentioned above, my only example was a female. I find by Thomson's description that in the male the marking of the head and thorax is less distinct, and the last abdominal segment is emarginate.

It appears from the above that this species is scarce with us, and especially so from the fact that it has not been enumerated in the catalogue of our indigenous Hymenoptera. It is also scarce in other places; Hartig found it once on *the willow*, and Thomson says rather scarce, adding, however, on *birch*, which I cannot explain.

Most probably this species has but one brood in the year.

INTRODUCTORY PAPERS ON *ICHNEUMONIDÆ*.

BY JOHN B. BRIDGMAN AND EDWARD A. FITCH.

No. II.—*ICHNEUMONIDÆ* (continued).

THE compilation of a concise table of our species of *Amblyteles* is a very difficult matter. The variation in many species is even greater than in the genus *Ichneumon*, and we again have not only the varieties *inter se*, but the great resemblance one species often bears to another in colour and markings, and the often great disparity between the sexes, or rather supposed sexes, of a species, for in several instances it is doubtful whether they are correctly paired. *A. conspurcatus* is still without a female. Tischbein considers *A. palliatorius* and *A. spoliator* one species; his series comprised sixty-two males and eighteen females. Brischke follows Wesmael in thinking that *A. fossorius* and *A. divisorius* ought to be united, while, on the other hand, Tischbein thinks Wesmael's *A. inspector* is distinct. Brischke also separates *A. subcylindricus* (Marshall's Cat., p. 22, l. 14, "*cylindricus*" should be "*subcylindricus*") from *A. Gravenhorstii*. Some of our species vary greatly, but perhaps the most remarkable case is *A. uniguttatus*. Of this species Wesmael described sixteen well-marked varieties, and gave thirteen species, hitherto considered distinct, as probable synonyms (these included *conspurcatus*). Tischbein describes and tabulates forty varieties of *A. uniguttatus* male, which include eight Gravenhorstian species (Stettin Ent. Zeit., xxxvi., 274).

A gynandromorphous specimen of the common *A. armatorius*—better known by its Fabrician name of *fasciatorius*—is described by Wesmael (Bull. Ac. Brux. vi., pt. 2, p. 448); the head and antennæ are male (*armatorius*), and the abdomen is female (*quadrinaculatus*). Taschenberg has also described a gynandromorphous *Amblyteles* as *A. hermaphroditus* (Berl. Ent. Zeit. xiv., p. 425), which he says is near *A. camelinus* and *A. fossorius*. A specimen of *A. cerinthius*, with an eye almost obliterated, is described by Rev. T. A. Marshall (Ent. Mo. Mag. xiv. 278).

There are many good figures of *Amblyteles*. *A. mesocastanus* (*vespertinus*) and *A. Proteus* are figured by Christ. *A. Proteus* is also figured by Donovan (pl. 478), with one or two other doubtful species. Capital figures of *A. monitorius*, *armatorius* (*fasciatorius*),

infractorius, *oratorius*, *notatorius* (*mediatorius*), *equitatorius*, *vadatorius* (*ambulatorius*), *occisorius* (*marginatorius*), *negatorius* (*ornatorius*), and *Panzeri* (*laboratorius*) are given by Panzer. Both Curtis and Stephens figure the rare *A. amatorius*. Wesmael figured the abdomens and hind tibiæ of *A. conspurcatus* with two varieties, and of his *A. novitius*, which is a variety of *A. margineguttatus*, in his plate illustrating the 'Ichneumones amblypygi Europæi' (Bull. Ac. Brux. Append. 1853—4, pl. ii., figs. 5—10). In Vollenhoven's 'Pinacographia' ten species of *Amblyteles* are figured on plates 7 and 27; of these *A. palliatorius*, *armatorius* (*fasciatorius*), *notatorius*, *vadatorius*, *occisorius*, *sputator*, and *repentinus* are British. Marshall removes *A. alticola* from the genus *Probolus*, Wesm., amongst the *Platyuri*, into *Amblyteles*; both sexes of this species are figured by Wesmael on his plate illustrating the 'Ichneumones platyuri Europæi' (figs. 1—3).

Mr. Marshall has followed Wesmael throughout in his arrangement of the species, and no references to Holmgren's 'Ichneumonologia Suecica' will be found, as probably the catalogue was compiled before the appearance of his second part (1871).

The economy of *Amblyteles* is similar to that of *Ichneumon*. The following is the list of hosts:—

- | | | |
|--|---|---|
| 1. <i>palliatorius</i> , <i>Gr.</i> | from <i>Smerinthus ocellatus</i> ; Marshall. | <i>Acherontia Atropos</i> ; Marshall. |
| 4. <i>monitorius</i> , <i>Panz.</i> | „ <i>Smerinthus populi</i> ; Giraud. | <i>Perigrapha cincta</i> *; Kriechbaumer. |
| 5. <i>armatorius</i> , <i>Forst.</i> | „ <i>Vanessa Atalanta</i> ; Marshall. | <i>Saturnia carpini</i> ; Marshall. <i>Xylophasia rurea</i> ; Brischke. <i>Mamestra brassicæ</i> ; Brischke. <i>Agrotis segetum</i> ; Marshall. <i>Tryphæna pronuba</i> ; Brischke, Butler. <i>Noctua xanthographa</i> ; Mosley. <i>Phlogophora meticulosa</i> ; Taschenberg. |
| 6. <i>infractorius</i> , <i>Panz.</i> | „ <i>Agrotis tritici</i> (<i>aquilina</i> , Hüb.); Rondani. | |
| 7. <i>amatorius</i> , <i>Müll.</i> | „ <i>Noctua</i> ; Giraud. Bred by S. L. Mosley (no host given). | |
| 8. <i>oratorius</i> , <i>Fabr.</i> | „ <i>Noctua festiva</i> ; Vollenhoven. | <i>Aplecta nebulosa</i> ; Bignell. <i>Noctua</i> ; Brischke. |
| 12. <i>notatorius</i> , <i>Fabr.</i> | „ <i>Tryphæna interjecta</i> ; Gir. | <i>T. orbona</i> ; Kriechb., Fitch. |
| 14. <i>crispatorius</i> , <i>L.</i> | „ <i>Macaria liturata</i> ; Rond. | |
| 15. <i>equitatorius</i> , <i>Gr.</i> | „ <i>Trachea piniperda</i> ; Panzer. | |
| 17. <i>glaucatorius</i> , <i>Fabr.</i> | „ <i>Cucullia verbasci</i> ; Brischke. | <i>C. artemisiæ</i> *; Brischke. <i>Anarta myrtilli</i> ; Brischke. |
| 18. <i>pallidicornis</i> , <i>Gr.</i> | „ <i>Noctua</i> ; Wesmael. | |

19. *vadatorius*, *Rossi* from *Agrotis segetum*; Brischke. *Tryphæna pronuba*; Voll.
20. *occisarius*, *Fabr.* „ *Gortyna flavago*; Eversmann, Rond.
21. *Gravenhorstii*, *Wesm.* „ *Leucania vitellina*; Kriechb. *Gortyna flavago*; Brischke. *Cucullia Santonici**; Wullschleger.
- ? *var. subcylindricus*, *Gr.* „ *Nonagria typhæ*, *N. sparganii*, *Gortyna flavago*; Brischke.
22. *negatorius*, *Fabr.* „ *Noctua brunnea*; Gir.
23. *uniguttatus*, *Gr.* „ *Abrostola urticæ* or *triplasia*; Goosens (*Gir.*)
25. *castanopygus*, *Steph.* „ *Dasypolia Templi*; Newman.
27. *castigator*, *Fabr.* „ *Vanessa Atalanta*; Steph., Brischke. *V. Io*; Steph., *Gir. Pyrameis cardui*; Steph. *Cleora viduaria*; Speyer (*Ratz.*); *Gortyna flavago*; Marshall. *Cucullia absynthii*; Boie.
28. *fossorius*, *Gr.* „ *Vanessa Antiopa*; Ratz. *Leucania lithargyria*; *Gir. Hadenæ adusta*; Brischke.
29. *divisorius*, *Gr.* „ *Nonagria sparganii*; Hering (*Ratz.*). *Hadenæ adusta*; Brischke.
31. *mesocastanus*, *Gr.* „ *Trichiura cratægi*; Nees (*Grav.*). *Aglossa pinguinalis*?; Voll.
32. *melanocastanus*, *Gr.* „ *Tæniocampa cruda*; *Gir. Dianthæcia cucubali*; Snellen (*Voll.*)
36. *Proteus*, *Christ.* „ *Smerinthus populi*; Voll. *Sphinx pinastri*; Ratz., Holmgren. *Chærocampa elpenor*; Albin, Steph., Ratz., Sichel (*Wesmael*), Kawall, Brischke, Taschenberg, Holmgren, Reinhard, Marshall, Bignell, Weston, Fitch.
37. *fusorius*, *L.* „ *Chærocampa porcellus*; B. M. Coll., Brischke. *C. elpenor*, Brischke. *Calimorpha dominula*; Boie.
38. *strigatorius*, *Gr.* „ *Heliothis dipsacea*; *Gir.*
39. *alticola*, *Gr.* „ *Hadenæ adusta*; Brischke. *Abrostola triplasia*; *Gir.*
- cerinthius*, *Gr.* „ *Acherontia Atropos*; Scott (*Marshall*).

HEPIOPELMUS, *Wesm.*

- A. Black; scutellum, frontal orbits and two spots at the apex of the post-petiole, white; flagellum of antennæ, male, on one side from base to middle, white; female, white-ringed. *Var.* post-petiole quite black; also the antennæ of the male. - - - Ichn. 61. *leucostigmus*, 7 lines (*a*).
- B. Scutellum, antennæ towards the middle, head, thorax and legs, marked with yellow; abdominal segments 1st and 2nd or 1st to 3rd with two yellow apical marks.

Ichn. 60. *variegatorius*, 6—7 lines.

Mr. Marshall retains these two species in the genus *Ichneumon* in his Catalogue, but Wesmael separated them, and later authors

have considered this genus a good one; we have removed them, as did Marshall in his 1870 Catalogue. *H. variegatorius*, Panz. (= *flavoguttatus*, Gr.), is spoken of by Stephens as the most beautiful species of the genus (*Ichneumon*). Panzer figured the two sexes as distinct species (*variegatorius*, male; *notatorius*, female). Both this and *H. leucostigmus*, Gr., are well figured by Vollenhoven in 'Pinacographia' (pl. 27, figs. 5, 6). Last year Mr. Bignell bred a female *H. leucostigmus* from the cocoon of *Odonestis potatoria*.

ACOLOBUS, Wesm.

Scutellum and abdomen black; head pale-marked; 4th and 5th joints of hind tarsi red.

All the tibiæ red; antennæ white-ringed; (female) $3\frac{1}{2}$ lines.

Front legs, the tibiæ, part of the femora and coxæ, white;
(male) 4 lines. - - - - - 1. *albimanus*.

Apparently the only known British specimen of this species is the single male captured near Netley, and sent by the Rev. F. W. Hope to Gravenhorst, from which the original description was taken. Wesmael captured two females near Brussels in July. A capital coloured figure of the equally rare, but not British, *Acolobus sericeus*, Wesm., is given in the plate illustrating his 'Ichneumones amblypygi Europæi' (figs. 11, 12).

ENTOMOLOGICAL NOTES, CAPTURES, &c.

THE NEW FOREST AT EASTER.—After the long and severe past winter and the weeks of continued easterly winds, the balmy change in the weather which came over London during the week preceding Good Friday tempted many to risk the fickleness of an English spring by leaving this great city for the country. Among the crowded exodus there were those, of course, who went net in hand to seek for the early summer insects, but only to find the season a fortnight or more late, and most of the spring species still in good condition, even in the full freshness of recent emergence. Accompanied by Mr. E. G. Meek, I started on Thursday afternoon, April 14th, for Brockenhurst, New Forest. Our object was to capture *Eupithecia irriguata* and such other good things as might come in our way. After the long and tiresome journey from London, we arrived the inevitable three-quarters of

an hour late—too late for any work that night. Friday was a charmingly sunny day, with nice soft westerly wind. By nine o'clock we had commenced our expedition into the Forest, choosing the road towards Lyndhurst, but turning off into Whiteley Wood, amongst the grand old oaks, which we thumped and thrashed with all the energy and vigour of renewed strength, after our long winter's rest. On comparing notes after three or four hours of steady work, we find our bag consists of the sorry array of some few *Eupithecia abbreviata*. We had seen *Diurnea fagella*, both males and females, in abundance and fine condition, as were *Tortricodes hyemana*. Continuing our rambles, we met Mr. Tate, of Lyndhurst, who told us of his captures during the month, which, with the exception of *Cymatophora ridens*, taken the day before for the first time, all his species were early spring moths. Strolling up to Bank, we returned through Hurst Hill, where we saw the first *Satyrus Egeria*, evidently just out of pupa. *Gonepteryx rhamni*, *Vanessa Io*, and *V. polychloros* were also seen, the two former commonly. Our walk ended through Queen's Bower, which, from its sheltered position, was warm and sunny, but added no additional species. Saturday was chiefly occupied by a long drive through Lyndhurst, past Rufus Stone, Stoney Cross, Bolder Wood, &c. Near Stoney Cross we saw the site of one of the great Forest fires which have recently occurred in many parts of the district. This particular fire had burned from five to six miles in length, and a couple of miles in breadth, doing many thousands of pounds worth of damage amongst the fir and other plantations. On Saturday evening we examined the large oaks in Holland's Wood, but nothing occurred worth taking. On Sunday we went for a long ramble through Holland's Wood, Ramnor, New Plantation, Stubby Copse, Denny Wood, Woodfidley, thence over the railway to Frame Wood and Lady Cross, along the Beaulieu Road, some fifteen miles in all. In the evening the wind, which had been blowing strongly from the east all day, died away, and we took the opportunity to try again in Whiteley Wood for *E. irriguata*, and were each rewarded by one male specimen, evidently just out of pupa. After dark the bloom of the blackthorn was examined with some success, for we found most of the commoner *Teniacampidæ*, including a very pretty red form of *T. gracilis*. *Alucis pictaria* was there in small numbers, while *Hybernia progemma* seemed to be only just out

of the pupa state. *Eupithecia pumilata* was flitting from flower to flower in numbers. We sought long and closely for *Dasy-campa rubiginea*, which had been taken in Ramnor the week previously by Mr. C. Gulliver, but we saw nothing of it. On Monday our attention was given to *E. irriguata*, but without success, a long and brilliant series of *E. abbreviata*, however, to some extent compensating for our labour in a high east wind. On Tuesday the weather was so bitterly cold, with occasional showers of sleet, that no collecting could be done, so we walked over to Lymington, and went by boat to the Isle of Wight. Wednesday being no warmer, we returned to London. In addition to the species already named, we may mention having taken or seen during our visit *Boarmia crepuscularia* (common), *Anticlea badiata* and *A. derivata* (both in fine condition), *Cidaria miata*, *Xylocampa lithoriza*, *Xylina rhizolitha*, *Demas coryli*, &c. Small larvæ of *Cleora glabraria* were not uncommon on lichen-covered trees. Before concluding, I must refer to the Rose and Crown Hotel, where we stayed at Brockenhurst; every attention is paid to the comfort of the visitor, the accommodation being nearly equal to a West-end hotel, and the prices nearly as satisfactory.—JOHN T. CARRINGTON; Royal Aquarium, Westminster, S.W., April 23, 1881.

VANESSA ANTIOPA AT HEADLEY LANE.—While collecting in Headley Lane, on April 17th, in company with Mr. Jobson, of the Haggerston Entomological Society, I took a specimen of *Vanessa Antiopa* at rest on the trunk of a birch tree. It was sitting full in the sunshine, and was in either a half torpid or exhausted condition, for it allowed me to take it between my fingers without any attempt at escape. It is a female, and, for a hybernated specimen, in fair condition.—J. A. COOPER; 32, Binglefield Street, Barnsbury, N., April 19, 1881.

VANESSA ANTIOPA.—It will, perhaps, interest many of your readers to know that, while trout fishing in a pool among the hills in Brecknockshire, on Saturday, April 16th, I captured a specimen (no doubt a hybernated one) of the now rarely seen Camberwell Beauty (*Vanessa Antiopa*).—C. F. H. (25, Down Street, Piccadilly, W.); in 'Field.'

VITALITY OF ACHERONTIA ATROPOS.—I have to record a most extraordinary instance of vitality in the case of a fine *Acherontia Atropos*, which I captured last autumn. Upon my first taking

it, it emitted a shrill cry, which continued without ceasing until I put it in my killing-box. This box is a close-fitting tin one, with a false bottom of perforated zinc. Being a large moth I dropped thirteen or fourteen drops of chloroform into the box, and kept it close between two and a half and three hours, at the expiration of which time, on opening the box, the chloroform was unpleasantly strong, and the moth to all appearance dead. I cut it open, eviscerated it, stuffed it with cotton-wool, and put it on the setting-board. To my astonishment, on inspecting it the following morning, it was quite lively, and, had the pin through the thorax not been a very strong one, would have liberated itself. I killed it by soaking it in benzoline, which, by-the-bye, I find the quickest and cheapest mode for all moths, and one doing them no damage.—ANNIE DOWS; Boston, Lincolnshire.

[We doubt whether the method of killing Lepidoptera recommended by our correspondent is the best; some of the older systems are less likely to damage the specimens,—the vapour of ammonia for instance.—ED.]

CHÆROCAMPA CELERIO IN DECEMBER.—On December 1st, 1880, I captured a specimen of *C. celerio* at Faversham. Not knowing what moth it was I did not attach much importance to it, until Mr. Waterhouse told me its name. I wish your readers to note the late season of capture of this rare species.—P. M. YEARSLEY; 1, St. Margaret's Terrace, Kilburn, March 20, 1881.

DESCRIPTION OF THE LARVA OF ATTACUS LUNA.—The prevailing colour of its body is light green, and the segments are adorned at regular intervals with tubercles of various sizes, from each of which spring clusters of minute bristles, in shape somewhat resembling spiked clubs; the tubercles on the 3rd and 4th segments are bright yellow, interspersed with black bristles or spines, and are situated on the top of conical protuberances, projections of the segments, which, being raised considerably above the dorsal tubercles, are most imposing and regal in appearance; the tubercles on the 11th and 12th segments are pale green with black spines, and similarly raised, one notably so in the centre of the latter segment, but less imposing in character; the tubercles on the intermediate segments are bright red and spinous; a light yellow lateral stripe, slashed at intervals with paler red, runs along either side of the body, above which are situated the peculiar oval-shaped red spiracles; there is a row of minute red tubercles, lessening in

size as they approach the anal segments, above, and a row of larger red tubercles below each lateral stripe; the surface of the body, particularly the dorsal portion, is studded with slender tufts of fine silken white hairs, scarcely perceivable; the head and legs are slightly ferruginous, the prolegs light green, and the anal parts and anal claspers rich brown.—G. J. GRAPES; 2, Pownall Crescent, Colchester, November 11, 1880.

LEPIDOPTERA NEAR DOVER.—On Thursday, April 14th, I went to Dover, and returned on the following Wednesday. Thanks to the suggestion of Mr. Gray, I found a nice lot of the full-fed larvæ of *Acidalia promutata* feeding on plantain and other low plants. They may also be found on the dry patches of earth near the food-plants. *Teniocampa leucographa* was taken at sallow bloom, and several were also taken last year by Mr. Davies. Acting on information kindly given to me by Mr. Sydney Webb, I found near Alkham the larvæ of *Psychoides verhuellella* feeding on the leaves of the hart's tongue fern (*Scolopendrium vulgare*). The larvæ make little cases generally on the under side of the leaves formed of the brown woolly spores, and in shape frequently just like the arrangement of the spores on the leaf. By hedgerows I took *Lobophora polycommata*, *Cidaria suffumata*, while the larvæ of *Callimorpha dominula* were in great numbers as usual.—THOS. EEDLE; 40, Goldsmith Row, Hackney Road, London, E., April 22, 1881.

APLECTA OCCULTA, &C., IN ESSEX.—On August 13th, 1880, I took a fine specimen of *A. occulta*, at sugar, at Hazeleigh, near Maldon. I remember seeing a record in 'The Zoologist' (I think of the year 1843) of this species being taken by Mr. Doubleday at Epping, but believe that is an insect rarely taken in Essex. Another insect, which I may record as new to the former part of Essex, also visited my sugar on August 14th, namely, *Euperia fulvago*. I may also perhaps be allowed to record the occurrence of an insect, tolerably abundant and widely distributed, but which till last year I had never seen alive in the same district,—that most beautiful of our yellow underwings, *Triphæna fimbria*. Of this species I took two examples at Hazeleigh, August 10th and 18th, and several on August 10th at Woodham Ferris Hall Wood, where Mr. E. A. Fitch informs me he took the larva in the spring of the same year. Taking sugar as a whole, last season I was fairly successful, more especially so towards the latter part of the

season, when *Cosmia diffinis* and *C. affinis* appeared in greater plenty than I remember to have seen them in any previous year.—[Rev.] GILBERT H. RAYNOR; The College, Ely, March 2, 1881.

CLOSTERA ANACHORETA.—In the year 1859, Dr. Knaggs announced that he had discovered eleven larvæ of this, till then, reputed British species. Ten pupæ resulted, and eggs were procured in due course. These, more or less, were distributed among various entomologists, and they having, in their turn, obtained eggs, the insect was bred for some years in such vast numbers as to become an absolute drug, and people ceased to keep up the brood any longer. Can any of the numerous readers of the 'Entomologist' inform me whether it has ever been taken since then in a "state of nature?" I observe in the 'Zoologist' for 1863, page 8694, a notice from Mr. Sidebotham that he had taken a larva at Folkestone very near the place where Dr. Knaggs made his discovery; and a similar notice from Mr. Meek, in the first volume, 1864, page 123, of the Ent. Mo. Mag. These instances are all I can discover, and they do not answer my question in the way I desire, as these larvæ were found in the same place as Dr. Knaggs's, and the "home breeding" had perhaps scarcely fallen through.—J. GREENE; Rostrevor, Clifton, Bristol.

COREMIA QUADRIFASCIARIA.—Seeing a notice of a new locality for this insect in the March 'Entomologist' (Entom. xiv. 70), I beg to add that I took five specimens, flying at dusk, in a lane near Nettlestead, Kent, about the middle of July last. Two of these specimens obliged me with some eggs, from which I have now a few larvæ feeding on the leaves of the white dead-nettle (*Lamium album*). I hope, therefore, that I may have the pleasure of breeding this species.—[Rev.] CHAS. F. THORNEWILL; The Soho, Burton-on-Trent, March 17, 1881.

STIGMONOTA SCOPARIANA BRED.—My hopes have been realised: this day I have bred three specimens of *S. scopariana* from the larvæ feeding in the flowers of *Genista tinctoria* last July. It is odd how extremely local some species are: I found these larvæ in one field only; I searched in vain other fields, but could not find any.—J. B. HODGKINSON; 15, Spring Bank, Preston, April 10, 1881.

DESCRIPTION OF THE LARVA OF PTEROPHORUS GALACTODACTYLUS.—During June last I bred a nice series of this very pretty "Plume," from liberal supplies of larvæ sent me by Messrs. W. H. Grigg, of Bristol, and F. D. Wheeler, of Norwich. From the

two lots of larvæ it would appear they attain full growth sooner or later in different localities, for the larvæ from Bristol were spinning up when received in the first week in May, and were all pupæ when the still smaller larvæ arrived from Norwich at quite the end of the month. They were feeding on the under side of the leaves of the burdock, eating through and quite riddling the large leaves. Length about three-eighths of an inch, and of moderate bulk in proportion; the head has the lobes rounded and polished, and is considerably narrower than the 2nd segment; body rounded at the subdorsal region, slightly flattened dorsally, and still more flattened ventrally; it is attenuated posteriorly, and also from the 3rd segment to the head; tubercles large and prominent, each of them emitting a tuft of moderately long hairs; skin very slightly roughened, and the segmental divisions well defined. Ground colour of the head and body uniformly pale pea-green, the mandibles brown; two rather distinct grey lines extend through the dorsal region, enclosing between them the less distinct, narrow, grey, medio-dorsal line; there is an indistinct row of grey spots substituting the subdorsal line, and the spiracular ridge is also greenish grey; hairs grey, those from the side tubercles stand out horizontally and are slightly curved, giving a remote resemblance to the larva of *Acronycta leporina*; ventral surface uniformly of the pale green of the dorsal area. When full-fed the larva spins a patch of silk on the under side of the leaf, or on the stem of the burdock, or on any convenient object near, and in a few days changes to a pupa. This, though laid flat, is attached to the silk by the anal hooks only, there being no silken belt round the body. Like others in the genus it is somewhat similar to that of a butterfly, or an *Ephyra*; is about five-eighths of an inch long, and of average proportions; thorax and head rounded above, flattened beneath; head bluntly rounded off; the leg- and wing-cases extend half-way down, but are detached from the abdomen. Ground colour bright green; two distinct white stripes extend from the thorax to the tip of the abdomen, and outside these stripes, on each side of the first two abdominal segments, are two conspicuous black spots, one on each side, and there is a faint indication of similar spots also on the other segments: as in the larva each tubercle emits a tuft of grey hairs. —G. T. PORRITT; Highroyd House, Huddersfield, April 5, 1881.

PRIONOCYPHON SERRICORNIS IN KENT.—Last year (in August or September) I took, in Kent, a small orange beetle, which I in

vain tried to set properly, and after breaking several of its legs I was about to throw it away, but on second thoughts I carded it as it was. Mr. Waterhouse has now recognised it as *Prionocyphon serricornis*, one of the rarest of our Coleoptera. As oak, nut, birch, and blackberry are numerous in the locality, it probably was beaten from one of these; most likely from one of the two first named.—E. A. BRUNETTI; 15, Low. Grosvenor Pl., April 18, 1881.

[The insect is not a common one, but by no means so rare as the captor seems to think. I am pretty sure that it exists in most of the better collections. I have myself by promiscuous sweeping taken some six or eight examples of it, and find specimens in my cabinet ticketed as Darenth (3), Birch Wood, Littleington (Cambridgeshire), and dated between June and August. It is very fragile, and requires to be set at once.—J. A. P.]

SCIENTIFIC NOMENCLATURE.—I need not reply to Mr. Clifford's imputation, particularly as, after our recent experiences, I am sceptical about our northern *Eupitheciæ*, and do not expect that the claims of *E. Blancheata* to specific distinction will prove less ephemeral than usual. But as regards his sweeping claim for the absolute right of a discoverer of a new species to name it as he likes—even, it might be, against the commonest rules of sense, grammar, and science—I must protest, and I utterly deny the existence of any such right. A right to give a name I admit, but the name must be in accordance with the recognised rules of scientific nomenclature. There are two universally accepted main rules as to the specific name. The first is that the name should be Latin, or at least Latinised; and hard as this rule may be upon the "little Latin and less Greek" which Mr. Clifford claims for the majority of the entomologists whom he knows, it is certainly a rule framed in the interests of science. In these wretched "collector's names" we often find a mere senseless agglomeration of letters containing a weak hash of two languages, with a flavouring of a third. The second main rule is that the name should refer to the insect's appearance or habits in one of its stages, or to its food-plant, or to the locality in which it occurs. When, as is occasionally done, this latter rule is infringed by naming a species after a person, the person so honoured should be some well-known leader in the science, and not a mere local celebrity utterly unknown beyond a small circle of admiring friends. Mr. Cooke's attempt at nomenclature, however, is a new departure, for he absolutely concocts a specific name out of a lady's christian name,—a bold

and novel proceeding, certainly, but one by which I utterly decline to be bound. If Mr. Clifford is an admirer of the bad example afforded by such names, "Copperhead," "Knownothing," "Werang," "Figulilella," "Zakharskevskyi," "Stscheglovii," and "Stschukini," and chooses to tax his inventive powers by creating such names as "Smithii," "Brownii," "Jonesii," and "Robinsoni," he is welcome to do so as far as his own collection is concerned; but I object to the imaginary right which he claims of compelling others to do the same, and thereby afford a fresh example of the truth of the old proverb.—C. A. BRIGGS; 55, Lincoln's Inn Fields, April 20, 1881.

REVIEW.

Insect Hunter's Companion. By the Rev. JOSEPH GREENE, M.A.
Third Edition. Revised and extended by A. B. FARN.
London: W. Swan Sonnenschein and Allen.

IF we remember correctly, in noticing this work 'Punch' recently said that visitors to the seaside could not have a better companion, but perhaps our venerable caricaturist mistook the actual meaning of the title of this little book. The former editions were so well known to our readers that it is quite unnecessary to give a detailed account of this handy little guide. In revising it, Mr. Farn has carefully brought the Rev. Joseph Greene's work up to the present state of knowledge of the art of collecting, having added much to the original work. A new feature is the addition of a number of woodcuts and figures, which will greatly assist the beginner; amongst these we may note the Bignell Tray, and a full set of apparatus necessary for the preservation of lepidopterous and other larvæ. Several modes of collecting are fully described which were little used when the former editions were published; notably, we may mention "Light." In conclusion, Mr. Farn has added some practical remarks upon collecting Micro-lepidoptera, which will be found useful to those who have not already paid attention to this branch of Natural History. Whether we address the schoolboy collector, or the more learned Entomologist, we can safely say that every one who reads this book will learn something, and find in it some suggestion which will be useful either in the field or the study.—[ED.]

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ON SILK-PRODUCING BOMBYCES.

BY ALFRED WAILLY.

(Membre-Lauréat de la Société d'Acclimatation de France.)

DURING the year 1880 the cold weather, which lasted till about the end of July, affected, as it did in 1879, most exotic Lepidoptera, and prevented the reproduction of several species. Ova obtained at a low temperature, even when the pairings of the moths have been of long duration, are partly and sometimes totally unfertile. No pairings could be obtained of *Attacus Mylitta*, *A. Aurota*, *Samia Gloveri*, *Actias Selene*, and some other species. However, the splendid weather we had during the month of August and part of September would have allowed of the successful rearing in the open air of the species obtained, had I been able to protect them from the sparrows. I had on trees in my garden *Attacus Pyri*, *A. Pernyi*, *Samia Cecropia*, *S. Promethea*, *S. Cynthia*, *Telea Polyphemus*, and *Actias Luna*. All these thrived splendidly. *Cynthia* (as usual) and *Promethea*, a very closely allied species, were not touched by the birds, but all the others were destroyed when in third or fourth stage, in all about 400 larvæ.

My greatest success, I ought rather to say my only success, was with *Actias Luna*, of which species I obtained twelve or thirteen pairings with the cocoons I had received from America. With about one hundred larvæ I obtained more than eighty cocoons. The larvæ were reared on walnut in large cages, and even under glasses, which shows that the species is easy to rear. The larva of *A. Luna* differs considerably from that of *A. Selene* in the first two stages. *A. Selene* in first stage is of a dark reddish colour, with a broad black band in the middle of the body;

in the second stage it is of a lighter red, without the black band; in the other three stages it is green, with bright yellow tubercles. *A. Luna* is green in all its stages, the colour in first stage being very light green, almost white; the tubercles are of various shades of red or crimson. The *A. Luna* moths emerged from the beginning till about the end of June. The larva feeds well on walnut, hazel, and other trees.

Of *Samia Ceanothi*, from California, I obtained two pairings, but was not successful with the rearing of the larvæ. One of my German correspondents, however, succeeded, with only six eggs of this species, in obtaining three cocoons, which I consider a very great success. *S. Ceanothi*, in the perfect state, is a little smaller than *S. Gloveri*, and of uniform colour on the four wings; rich brown, with white bands and markings. *S. Gloveri* seems to partake of *Ceanothi* and *Cecropia*, but the cocoon of *Ceanothi* is entirely different from those of *Gloveri* and *Cecropia*; it is pear-shaped, and very pointed at the open end. The interior cocoon, of a brown colour, is small compared to the exterior envelope, which is iron-grey. Most of the *Ceanothi* larvæ I obtained died in the first two stages; a few reached the third stage, and were thus:—Back of body sky-blue; sides greenish yellow; tubercles golden yellow all along the back, and on the sides blue; head green.

Ceanothi-Gloveri hybrid.—Many pairings took place among different species, the ova being in all cases unfertile, excepting that of a cross between female *Ceanothi* with *Gloveri*, which lasted from the evening of the 20th to that of the 21st May, 1880. Over two hundred larvæ hatched from the 15th to the 21st June. Unfortunately they all died in first or second stage, a few reaching the third stage. In the third stage the larvæ were thus:—Back bluish; sides yellow; tubercles on back orange-red; tubercles on sides blue; head yellow. One of my American correspondents succeeded in obtaining cocoons of a hybrid between *Ceanothi* and *Cecropia*.

In 1880 the cocoons of *Gloveri* were very bad, and I obtained from my large stock a swarm of cripples, and many pupæ were dead. This year (1881), on the contrary, the *Gloveri* cocoons are both larger and heavier, and the stock I have promises to give chances of success for the rearing of this fine species in England and on the Continent. These cocoons, in 1880 and 1881, were

collected at some distance from Salt Lake City, Utah; they are found on narrow-leaved willows growing in or near swamps.

The reverse has taken place with respect to *Ceanothi* cocoons from California, which in 1880 were fine and large, while in 1881 hardly any cocoons could be collected, and these only about half the size of the *Ceanothi* cocoons of the year 1880. I regret to say I have not received any *Ceanothi* cocoons this year, at least up to the present time.

In 1880, for the first time, I attempted the rearing of *Attacus Atlas* from ova which were sent to me by a French correspondent about the middle of August. The season being then too far advanced to give me any chance of success for rearing the larvæ, I only kept twelve ova to see what would come of them. Of the twelve ova, five larvæ hatched on the 22nd August; three died in the first or second stage, but two lived on the barberry, under a bell-glass and in splendid condition, up to the 6th November, when I sent them to a correspondent for preservation. The larvæ had remained thirty-two days in the fifth stage, which is the last but one. From this experiment, I think *Attacus Atlas* is a species easy to rear.

Attacus Aurota.—In 1880 I for the first time received live cocoons of this splendid species (the South American Atlas) from French Guiana. The moths emerged in splendid condition from the 12th June to the 3rd July, but no pairings could be obtained, the weather being unusually cold, as it has been observed. Moths and specimen cocoons of *Attacus Aurota* may be seen in the Insectorium of the Westminster Aquarium, where they may be compared with *Attacus Atlas*.

Attacus Aurota in French Guiana has six generations in the year; the larvæ form their cocoons twenty days after their hatching. Another species found in French Guiana, *Attacus Hesperus*, is only fifteen days from the hatching of the larva to the formation of the cocoon. *Attacus Aurota* and *Hesperus*, both very brilliant species as perfect insects, produce cocoons of good silk, but they are, like *Atlas*, *Cynthia*, and many other species, open at one end. I hope to receive cocoons of these two species for this season, and if so, I hope also to have some success with the pairings. The difficulties to reproduce exotic species in this country are very great and various. Sometimes the moths emerge too late, sometimes too early, as it has been the case this

season with *Attacus Roylei*, the Himalaya oak silkworm, and *Actias Selene*. On the 4th and 5th March, 1881, two males and one female of *Attacus Roylei* emerged, and to my great surprise a pairing took place; the greater part of the ova obtained shrunk, but a good number show now (4th April) but a very slight depression, and may be good. Several *Selene* moths also emerged from the middle of March to the present moment (4th April).

A fuller report on the species bred in 1880 will be found in the 'Journal of the Society of Arts,' February 25th and March 4th, 1881. It contains an article on the collecting and rearing of larvæ, and also on the best plan to adopt for sending living cocoons and pupæ from distant countries to England. Articles on the same subject appeared in the 'North China Herald,' November 25th; the 'Madras Athenæum' and 'Daily News,' December 4th, 1880; the 'Times of India' (Bombay), the 'Indian Agriculturist,' and other papers.

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BUTTERFLY HUNTING IN NATAL: ON THE COAST-LANDS.

BY WILLIAM D. GOOCH, C.E.

(Continued from p. 105.)

AFTER our frugal lunch, our little party marshalled, we enter within a few paces from where we have rested, the long open glade on the summit of the hill, chiefly made up of Kaffir-Boom trees, which is the special haunt of *Ophidicephalus*, and we have barely arrived, ere himself in person interviews us. Taken somewhat by surprise, the veteran's stroke is lost, and I make none, or I should have inevitably captured his hat instead of *Ophidicephalus*, as it was the most prominent object to hand.

A minute or two later we are stationed in a narrow part of the glade, well shaded from the fierceness of the sun, and with a tunnel formed in the bosky depths, through which the coursing insects charge headlong in pursuing their flight along the glade, which is clearly continued, although much constricted.

Mark! cry I, and our veteran in eagerness strikes at the lounging male, which approaches not apparently at a great pace, but in a most deceptive way, his tails undulating and swaying as the insect swings forward, travelling, however, as a matter of fact

very rapidly. The keen eye and quick wrist of the veteran is too much for the victim, despite his doubling dodge; but less the tails, which have been spoilt by the too eager stroke of the veteran, *Ophidicephalus* is, however, safe, and soon impaled: the specimen is not a very good one, and so the loss of the tails is not very lamentable.

A quarter of an hour more brings us good luck; we take between us eight fair specimens. I then leave the veteran, whilst I look for the larvæ of two or three of the big *Saturnia*, which occur on the Kaffir-Boom, as also of *Cyllo Leda*, which feeds on the coarse-ribbed bush-grass forming the undergrowth about here. I am more successful in my hunt than has been the veteran, who on my return has taken no prizes, not having seen a single specimen; but he has added *P. Leonidas*, several *Danaïdæ ocheleæ*, and taken a lovely moth, closely allied to our genus *Catocala*, but much larger, and with a sort of silvery sheen over the scales of the fore wings. I think it is an *Ophideres*. The specimen is the only one like it I have ever seen, and differs by the black emargination of the under wings on the orange-ground from the ordinary type.

Having followed the glade along the hill-top, we arrive without any great captures at an old Kaffir garden. Here are *Acræidæ* and *Pieridæ* in plenty. We hence strike the Kaffir path leading down to the river, and have barely left the clearing when a day *Saturnia*, *Aphelia Appolinaris*, flutters within the veteran's reach, and is bagged. Several others follow, and we find ourselves in a "school" of them, evidently just emerged from the pupa, and swooping about in a very inexperienced way. Twelve or fourteen specimens are collected very rapidly, three of which are tawny yellow, with the veinings in a violaceous grey; this is a very usual form of variety. Every brood I have reared has yielded a definite number of the tawny variety; at first I considered it a sexual difference, but I found on closer examination they were of both sexes. The moth is very delicate and transparent winged when seen in the sunlight. The larva also is conspicuous and handsome, with a slight anal horn, almost approximating *Sphinx* in type.

A tortuous path, in which several Geometers and a "Blue" are taken, leads us abruptly to the open face of a grassy and somewhat precipitous hill-side covered with *Mimosa* scrub,

the change of locality altering the character of the flora throughout; before entering the greenland, however, two "Mother-o'-Pearls" fall to our lot on the edge of the bush, and some insignificant *Hesperiidæ*.

We descend the hill pretty rapidly, and on our way take for the first time *Nymphalis Candiopæ*. We both of us mistook it for *Philognoma Varanes* till netted,—a very common error,—although he is really still more like *N. Pelias* than the other. A small ravine crossed, and a patch of scattered bush is examined, where *Neptis Goochii* and *N. Saclava* are both taken; the former on a *Mimosa* spray in the bush, the latter on an ironwood. Here also we find two specimens settled in the shade of *Argyris Latonaria*, a white geometer, with jewelled spots on its wings of great beauty; an insect that is abundant in Natal, and is common also in India.

From the bit of bush we emerge, somewhat hot, on a clearing, now being hoed for sugar-cane, but originally planted in coffee, an evidence of the vicious taste of the Longicorn, *Leuconota Capa*, which has cost the colony many thousands of pounds by its depredations in the coffee trees, which it attacks in preference to its own bush-food. I suppose in the gross, without exaggeration, at least £100,000 has been sunk in coffee planting in Natal, and has all been eaten up by this insect.

On the edge of the clearing we take *N. Brutus* again, sucking gum on the sunny side of *Mimosa*: as the branch is low and not much protected by thorns, we take him easily. I think, too, about this time—it is nearly 3 p.m.—the insects which have been sipping freely are stupid, if not tipsy, and do not seem so active or quick as earlier in the day. The lower edge, in the rank weeds of the clearing opening out on to grass land, yields *Anthocaris Ione*, several *Colias Electra*, two or three *Pieridæ*, and *Ismene Valmaran*, on Labiate flowers. Crossing the grass land we get Geometers, put up as we pass, and also take *Hypanis Ilithyia*, which is present in both varieties, in great numbers. A big *Libellula Myrmeleon* flops hurriedly across us and is captured, very beautiful of colouring and marking; and another is missed and marked down, but we do not follow it.

At the bottom of the grass we come into an avenue of *Bois-Noirs*, leading up to the neighbouring planter's house. This avenue is an unfailing locality for *Nymphalidæ*; and as we

follow it along to the River (Umblanga), which we are now approaching, *Nymphalis Ethalion*, *N. Cithæron*, *N. Neanthes*, and *N. Zoolina*, are all victimised in a couple of hundred yards.

When we reach the river, instead of crossing it by the Drift we follow a path by its side, till we reach some precipitous rocks, with rather rough walking and sedgy margin with patches of nettles. A little examination shows us *Diadema Dubius* and *Anthedon*, and after several trials we get the latter. As, however, the sun is low and off most of this face, we push on, and the veteran makes up his mind to try a quiet morning by himself along this bit of country, now that he knows his way about. Along this clifty scramble for a quarter of a mile and we emerge suddenly in a mill yard, with all the busy operations of sugar-crushing, &c., going on. As the steam and the smell and heat are not inviting, and we are nearly due on the top of the hill, a mile away, to meet the ladies, we turn abruptly up the cliff face, the bottom of which we have been following, and after a stiffish pull find ourselves a couple of hundred feet above the mill. As we leave the stream, however, we take a local insect, *Mycalesis Perspicua*, a rather pretty little *Satyrus*.

The view of country, that opens out to us from this summit, is a rolling sweep of ground rising gradually, and dotted with patches of scrub, chiefly *Mimosa*. In the distance is the dark green of the Bush, in which we first adventured in the morning. The grass is rather brown and patchy, and the country is rocky, but we add to our captures the well marked *Anthocaris Eris* and *Acræa Punctatissima*, both pretty numerous and excessively local in their occurrence, this being the only spot in the country-side where I know them to occur. *Anthocaris Danæ* is caught, male and female, on some yellow flowers, feeding; and *Junonia Cloantha*, a very typical insect of this open country, is in fair plenty and good condition.

Rising the next hill we come in sight of our trysting place, and see the cart waiting for us. In order not to keep the ladies waiting we push on rather hurriedly; but, despite our gallantry, I am bound to diverge to a quarry not far out of the way in which I always can count on getting *Alæna Amazoula*, and to search a patch of rocks where *Leucochitonea bicolor* is not unusual: the latter we find, but only an old used-up specimen; the former, we

take five specimens, settled on grass-stalks out of the sun on the steep quarry face.

We are hot and tired as we reach our friends, and we hail the cart with delight, and are still more pleased when we find our fair comrades have brought a boy and some tea, and that ready for us is "the cup that cheers but does not inebriate." How we sip that tea; and how pleasant it is to throw oneself on the grass in the shade and divest oneself of the paraphernalia, which was our pride as we started, but is, alas, an encumbrance now. Refreshed by our dish of tea, and entertained also by a dish of scandal,—for our fair friends, *en route* to the rendezvous, have called in at a neighbour's, and have just heard everything about everybody up to date from the best gossip of the whole country-side,—we started our "native contingent" home on foot with the spoils of the chase.

Having changed our linen sun-coats for light cloth ones we place ourselves in the hands of the ladies, who have brought out the team of four-in-hand to show the veteran the country round. As it is 5 o'clock already, and the sun sets about 6.30, we have not a long time to do ten miles in, which is the drive we propose.

By permission the nicotian weed is lit, and we are amused by a desultory conversation which goes on between us,—partly local information, partly notes on the work just done, partly tittle-tattle from the "other side" about somebody, and partly caressing remarks by John (the driver) as to the points, qualities, and idiosyncracies of the horses he is driving. The cape cart we are in is like a big dogcart, with shifting seat to balance, with a hood of white canvas over it to keep off the sun and dust; the wheels are strong and high, and for rough roads and quick travelling they are admirably adapted. After his whiff is over, instead of taking the ribbons myself, I induce the veteran, who is a lover of the art, to "try their mouths;" and John gives up his place, and the veteran takes kindly to the ribbons, and, guided by me at his elbow, lands us home.

Ten minutes with the nets in the gloaming on a patch of geraniums gives us *Pamphila Dysmephila*, on the wing with the hawk-moths, and hardly to be distinguished from *Lophura nana* of that ilk. We also take *Cyllo Leda* looking for sugar, which, by the bye, the boys have forgotten to put on; our five miles (for

them eight miles) tramp and the strong tea have put the sugaring out of their heads.

In the verandah, after dinner, we discuss and count our captures, and we find just short of 400 insects to our two nets, most of them new as captures to the veteran, and all of them of interest or beauty.

Who would not, after this, wish for "such a day's" butterfly hunting in Natal.

The Cottage, Richmond Hill, Surrey, May, 1881.

INTRODUCTORY PAPERS ON ICHNEUMONIDÆ.

BY JOHN B. BRIDGMAN AND EDWARD A. FITCH.

No. II.—ICHNEUMONIDÆ (*continued*).

TROGUS, *Panz.*

Thorax black with yellow marks, scutellum yellow, sometimes some red on the thorax; abdomen either entirely fulvous, or apex more or less black; greater part of legs fulvous; antennæ not white-ringed.

A. 2nd and 3rd ventral segments with a longitudinal fold in the middle. - - - 1. *lutorius*, 10—12 lines.

B. The ventral fold on the 2nd segment only.
exaltatorius, 12—14 lines.

Trogus lutorius, Fabr., is the largest and best known of our British Ichneumons. It is by no means rare, being frequently bred from the pupæ of various *Sphingidæ* by lepidopterists, especially from *Sphinx ligustri* and *Acherontia Atropos*. Mr. R. S. Edleston records it as being very destructive to *Smerinthus ocellatus* on Chat Moss in 1838 (Entom. i. 263); we have also bred it from this host, as well as from *S. populi*. This species may be frequently captured during the summer months heavily flitting—something between a fly, a jump, and a buzz—along privet hedges, at all times of the day. The typical *T. lutorius* is figured by Albin on his Plate vii., and the variety with a black apex to the abdomen (*T. Atropos*) by Curtis on Plate 234. Mr. Marshall, for some reason not expressed, did not include *T. exaltatorius*, Panz., in his Catalogue. The species is considered good by Wesmael, Holmgren, Brischke, Tischbein,

and Taschenberg; it is certainly British, being commonly bred from *Smerinthus ocellatus*.

The talented George Newport made *Trogus lutorius* the subject of one of his numerous anatomical studies, and the results are given in an important memoir communicated to the Linnean Society in June, 1849 (Trans. Linn. Soc., xxi., pp. 85—93, pl. ix.; 1853). The following is the economy of *Trogus* as observed by Newport. The egg is laid in the Sphinx-larva, probably directly after it changes its skin for the last time, since Newport found the parasitic larva more than one quarter of an inch in length about a week before the caterpillar was full fed; the *Ichneumon* larva was always “internal to the muscles, imbedded in the so-called fatty tissue, between them and the alimentary canal, and always on the dorsal surface, and usually with its head in the direction of that of the caterpillar. I have found it in different stages of growth, from one-fourth to three-eighths of an inch in length, as early as the middle of August, when it is of a light pea-green colour; but I have obtained full-grown specimens only from the pupa of the Sphinx, sometimes as early as the end of October, but more frequently not until the commencement of March, and sometimes as late as the end of April. Usually one egg only is deposited in each caterpillar, but sometimes there are two, and both become hatched, although of the parasites one only arrives at maturity, as one is invariably destroyed by the other.” One case (March 13th, 1832) is fully recorded, and this apparently was by no means a unique one. “The usual situation of the parasite in the Sphinx-pupa is in the tissue of the middle part of the body beneath the dorsal vessel and above the stomach, on which it often rests. . . . The change to a nymph usually takes place in April, but when placed in water at that period it soon perishes, as its respiration has then become more active. . . . The length of time which it remains in the nymph-state is about a month or six weeks at the utmost, as most of the specimens I have bred from the pupa have appeared in June. The perfect insect makes its way out of the dead pupa of the Sphinx by perforating the case with its mandibles on the dorsal surface, and sometimes it becomes fixed in the orifice and unable to escape.” The larva is described in full detail. This life-history may be taken as typical of the *Ichneumonidæ* generally; compare the remarks under *Ichneumon*.

AUTOMALUS, *Wesm.*

Thorax black; scutellum white; abdomen blue-black, apical margin of 1st segment and an oblong spot on the 7th, white; tibiæ partly pale-marked. *alboguttatus*, 6—8 lines.

Taschenberg, Holmgren, Brischke, and Tischbein, retain Wesmael's genus, as did Marshall in his first Catalogue; but later he again places *A. alboguttatus*, Gr., in *Trogus*. This species is common in Britain, and Tischbein relates that one warm day in June he met with a swarm of from thirty to forty specimens on a spot of ground less than two feet in diameter in a wooded enclosure, near the castle of Schaumburg on the Lahn (Rhenish Prussia). He examined the spot closely, but could find no pupæ or cocoons from which they could have been bred, nor anything to account for the curious assemblage (Stett. Ent. Zeit., xxxv., 298). Boie, Ratzeburg, Brischke, and Giraud, record this species as a parasite of *Orgyia pudibunda*; Vollenhoven has bred it from *Thyatira batis*, and also, doubtfully, from *Liparis auriflua*. Of the seventeen specimens in the National Collection there is one (imperfect) which Mr. Desvignes considered distinct. Foerster erected the genera *Trogus*, *Automalus*, and *Dinotomus* (new), into a new family—Trogoidæ (Verh. Pr. Rheinl., xxv., 188). This appears quite unnecessary.

ANISOBAS, *Wesm.*

Abdomen, 1st to 3rd segments red or marked with black; more or less of the apical segments marked with white; greater part of legs red; antennæ of female white-ringed, and sometimes the male also; scutellum sometimes white, sometimes black. - - 1. *hostilis*, $3\frac{1}{2}$ — $4\frac{1}{2}$ lines.

LISTRODROMUS, *Wesm.*

Basal segments of the abdomen with a pale spot on each side; 4th to 7th pale.

A. Scutellum, and marks on abdomen, yellow; antennæ, and tibiæ of the female, red, tibiæ of the male yellow, apex of hinder dark; scutellum of male black.

1. *quinqueguttatus*, $3\frac{1}{2}$ lines.

B. Marks on abdomen white; thorax of female more or less red; scutellum of male black; legs dark, front legs partly pale.

2. *lapidator*, $2\frac{1}{2}$ — $3\frac{1}{2}$ lines.

The Listrodromoidæ formed another of Foerster's new families (Verh. Pr. Rheinl., xxv., 191); it included the two genera,

Listrodromus (quinqueguttatus, Gr.) and *Neotypus*, Foerst. (*melanocephalus*, Gml., and *lapidator*, Fabr.). Marshall has not adopted the new genus, and Vollenhoven more recently expresses strong disapproval. Both species of *Listrodromus* in our list appear to be exceedingly rare. The first species is better known by its female name (*nycthemerus*). Gravenhorst says of the female, "unicam feminam pedemontanum Bonellio debeo," which is the one described; and of the male, "mas unicus (germanus?) erat in collectione Roentgeniana." Wesmael says, "this species appears to be excessively rare in Belgium; it is more than thirty years since I took the three females mentioned in my 'Tentamen,' and I have not seen it since." No other authors appear to know it. There are four beautiful specimens in our National Collection from Mr. Desvignes' collection (for description see B. M. Cat., p. 18). *L. lapidator* is also rare, but much more generally distributed than *L. quinqueguttatus*. Wesmael had three females from Prussia, France, and Sweden, but did not know it from Belgium. Tischbein says rare near Birkenfeld. It is very doubtfully British. Mr. Desvignes introduced Gravenhorst's *L. nobilitator* into his Catalogue (p. 29) from a specimen in his own collection; this is now in the British Museum, and certainly is not *L. lapidator*. We have good coloured figures of both these rare, but striking, species:—*L. quinqueguttatus* in Wesmael's 'Ichneumones Amblypygi Europæi' (plate, fig. 13), and *L. lapidator* in Vollenhoven's 'Pinacographia' (pl. 27, fig. 8).

HYPOMECUS, Wesm.

Scutellum white; abdomen black.

Marks of head and thorax whitish straw; ring of antennæ and tarsi white; femora and tibiæ red; *var.* tarsi without the white ring. - - - 1. *albitarsis*, 5—6 lines.

Wesmael gives good figures of the two sexes of this somewhat variable insect (Ich. Ambly., pl., figs. 14—17), but specially tells us that it has but little affinity with the preceding genera; it still, however, remains in the position where Wesmael left it provisionally. Brischke bred this species from *Acidalia trilineata*,* *Melanippe luctuata*,* and *Anticlea berberata*. It is generally rare, especially in Britain. Mr. Cameron has taken two specimens of the variety without the white tarsal ring, at Cadder, near Glasgow.

ENTOMOLOGICAL NOTES, CAPTURES, &c.

CLOSTERA ANACHORETA.—In answer to the enquiry of the Rev. J. Greene, in the last number of the 'Entomologist' (Entom. xiv. 117), I send an account of my own experience with *Clostera anachoreta*. In September, 1861, my father found a larva feeding on poplar in some small plantations below West Cliff, Folkestone; but I did not recognise the species till the pupa hatched on April 27th, 1862. The poplars in these plantations were, I think, chiefly the balsam poplar, the species with large leaves, coming out early in the spring, and with the buds resinous and fragrant. There were also a few small black and Lombardy poplars among them. This larva of *C. anachoreta* and the subsequent ones of this species we found in 1862 and 1863 were only on this "balsam poplar." In the autumn of 1862 my brother and I found twelve larvæ of *C. anachoreta*: one died when young, the other eleven changed into pupæ, all of which hatched in the following spring (1863), between April 13th and May 7th, and were all good specimens except one, which was slightly crippled. We also found that autumn (1862) larvæ of *C. curtula*, *C. reclusa*, *Notodonta ziczac*, *N. dictæa*, and *Dicranura vinula*; but all the species of *Clostera* were on the balsam poplar. In October, 1863, we found *N. ziczac* and *N. dictæa*, and one larva of *C. anachoreta*, which we did not keep, as we had bred them in plenty. During that month we turned out eighty-four nearly full-fed larvæ of *C. anachoreta*, but not all bred from the same parents, in different places along these plantations. We put the larvæ on the same species of poplar we had first found them on, in order thoroughly to establish the species there; but since that date we have neither of us seen the larva of *C. anachoreta* there, although we have been at Folkestone every autumn up to the present time. This may be partly owing to the fact that most of these young poplars have died, or had their lower branches trimmed and grown too high to search; neither have we since that date (1863) found there the other larvæ just mentioned. Not having been down at Folkestone much in the spring of the year, I have not often been able to search for the spring brood of *C. anachoreta*. I may mention that, so far as my own experience goes, the larvæ of *C. anachoreta* here fed only on the lower branches of these balsam

poplars, and each time it moults it spins a white web between the leaves. Not having seen an *Anachoreta* larva for eleven years, I was deceived in the spring of 1874 by finding some young larvæ in these plantations, which proved to be those of *Liparis salicis*. I do not remember having seen a published description of the young larvæ of this species, which have a small tuft of black hair on the 5th and 6th segments, and a smaller tuft of pale hair on the 11th and 12th segments; these tufts, characteristic of the family, were conspicuous while the larvæ were very young, but became almost obsolete as they became full fed. They spin between leaves for moulting, in exactly the same manner as the larvæ of *Clostera*. When I returned home and compared these young larvæ with the description of that of *C. anachoreta*, made by myself, I saw my mistake, but did not recognise them as those of *L. salicis* until their last moult. To save others from making a similar mistake I append a description of the larva of *C. anachoreta*:—Head dark brown; two conspicuous tubercles, one on the 4th and one on the anal segment; anterior segment black at the base, crowned with crimson, with a *large white spot* on each side of it, and another minute spot in front of the large spot; posterior segment blackish at base, and crowned with chestnut colour. Back pale buff, with a dusky dorsal stripe, and another on each side of this stripe and parallel with it; sides dark bluish grey, minutely lineolated with black. Feet and abdomen dirty dark buff; above the feet an interrupted orange line, with an interrupted black line immediately above it; spiracles orange, and along the margin of the buff back is a row of orange spots, with an angulated black spot under each of them.—T. H. BRIGGS; Hampton House, Teddington, May 14, 1881.

DESCRIPTION OF THE LARVA OF HELIOPHOBUS HISPIDA.—On March 18th, 1879, I received from Mr. G. C. Bignell, of Stonehouse, Plymouth, three larvæ of this species, which had been sent to him from Torquay. Being about full grown I described them at once, as follows:—Length nearly an inch and a half, and of moderate bulk in proportion; head polished, has the lobes rounded, and is very slightly narrower than the 2nd segment; body cylindrical, and of nearly uniform width throughout; segmental divisions well defined, the skin smooth and soft; the ground is a stony greyish brown, strongly suffused in some specimens with rust-colour, and this rust-colour will probably

show at the segmental divisions in most examples; head pale brown, with darker mandibles, and a conspicuous streak of dark sienna-brown on the upper part of the inner side of each lobe, and a similarly coloured spot on the outer edge of each lobe; two fine dark smoky lines, enclosing between them an indistinct pale line, form the dorsal stripe; subdorsal lines greyish yellow, bordered above with a series of longitudinal dull black streaks and below with a series of large marks of a similar colour, these lower marks, however, being very indistinct on the frontal segments; there is only a faint indication of a very fine pale line along the spiracles; spiracles intensely black; ventral surface, legs and prolegs uniformly of a dingy greyish tint, and the skin so translucent that the working of the muscles of the whole surface can be distinctly seen through it. Feeds on grass, and when full fed forms below the surface, amongst the roots of the grass, a tolerably compact cocoon of silk and earth. The pupa is about half an inch long, and rather dumpy in appearance, being broad across the thorax, but the abdominal divisions much narrower, and tapering sharply off to the anal point; neither the head-, leg-, nor wing-cases are at all prominent, the whole surface being rather evenly and bluntly rounded; it is polished, and almost uniformly of a bright brown colour, the colour indeed being exactly that of the familiar pupa of *Mamestra brassicae*. Two beautiful imagos, male and female, emerged on September 26th. — GEO. T. PORRITT; Highroyd House, Huddersfield, May 3, 1881.

LYCÆNA AGESTIS IN DERBYSHIRE.—During the last week of May, 1880, I took large numbers of *Lycæna Agestis* at Dovedale, four miles from here. They were confined to a very limited locality about six yards square, on the marshy side of a hill, fluttering among the rank grass with *Lycæna Alexis* and *Chortobius Pamphilus*. I never remember seeing them in any other locality near here.—T. H. HALL; Ashbourne, Derbyshire.

LYCÆNA ARGIOLUS.—I caught a female *Lycæna Argiolus* in my garden here on Easter Sunday afternoon, April 17th. This seems rather early, especially having regard to the long-continued easterly winds which have prevailed. Newman, in his 'British Butterflies,' only mentions one capture so early as April 9th, the usual time being May, and later.—HORACE FRERE; Queen's Road, Kingston-on-Thames, April 20, 1881.

ARCTIA FULIGINOSA.—An example of *Arctia fuliginosa*, bred from a cocoon sent me from Scotland, which emerged May 12th, has the cilia of the hind wings an intense black, instead of the usual bright rosy red. Is not this somewhat uncommon? The Scotch specimens of this moth appear to be smaller and darker than our own.—JOSEPH ANDERSON, jun.; Chichester.

ACRONYCTA ALNI.—I had the pleasure of breeding a beautiful specimen of *Acronycta alni* on May 14th, from a larva found in the New Forest last summer; and on the 18th another emerged in good condition, but smaller in size.—ID.

NEW LOCALITY FOR ORTHOSIA SUSPECTA.—When sugaring last August in the North of Kent I took two specimens of *Orthosia suspecta*. I was at first puzzled; but it was named for me by a well-known entomologist. To be certain on the matter I went to the British Museum, and examined the series there.—R. W. BOWYER; Haileybury, Hertford, May, 1881.

NOTES ON MICRO-LEPIDOPTERA NEAR PRESTON.—*Colcophora olivaceella*.—I was fortunate enough to find, last year, cases of this rare insect at Armathwaite, near Carlisle. When first noticed, attached to the trunks of trees above *Stellaria holostea*, they were supposed to be cases of *C. solitariella*; and it was not until the autumn, when I had time to compare the perfect insects, which emerged, with a description in a number of the 'Entomologist's Intelligencer,' that the truth was suspected. The larvæ of *C. olivaceella* appear to feed up in the autumn and retire to tree trunks, and perhaps other similar places, for refuge during the winter. The cases are like those of *C. solitariella*, but lie almost prostrate, instead of standing straight out from their resting-place. I have not yet seen the mine, as those bred last year and collected at Whitsuntide, and those collected this Easter, have refused food, and appear to be in the pupa state. In a notice some years ago by Mr. Stainton he represents the mine as being greener than that of *C. solitariella*, and he found larvæ feeding in April. This is rather puzzling, and I do not quite see how the difficulty is to be surmounted. The perfect insect is rather like *C. solitariella*, but is larger, of a darker colour, its wings are broader and more glossy; and when the series of each insect are compared the difference is at once most distinctly apparent. *Xysmatodoma argentimaculella*.—I think

that Armathwaite has always yielded the larvæ of this insect, as I found many delicate tubes amongst the grey lichen on the rocks, tenanted by light green larvæ with black heads. As I cannot find anywhere a description of the larva of this species, this must be considered a mere conjecture, hazarded with the view of extracting information from anyone who may know. *Elachista humiliella*.—This insect puzzles me. Can it be the male of *Elachista perplexella*? The 'Manual' says of it, "male unknown." Now in Brockholes Wood, near Preston, I take yellow larvæ feeding in *Aira cæspitosa*, which produce both the dark males and the females with more distinct spots; and these, I venture to say, are probably respectively *E. humiliella* and *E. perplexella*, thus reducing the two species into one, whichever name may have the priority. Mr. Murray, of Carnforth, was last year most fortunate in his captures at Witherslack amongst the Micros. He took, and kindly gave to me, a male of *Psyche opacella* and one of *P. calvella*, and it will be curious if we cannot this year turn up these insects again.—J. H. THRELFALL; Preston, April 27, 1881.

HYMENOPTERA IN DORSETSHIRE.—While searching for spiders among heather, coarse herbage and *débris*, I have on various occasions met with the following, mostly apterous, Hymenoptera. I am indebted for the names of these little insects to Dr. Capron, of Shere, near Guildford, and Mr. Bridgman, of Norwich, who have kindly examined the specimens. *Pezomachus micrurus*, Foerst., appears to be new to Britain. I should add that one of the examples of *Hemimachus fasciatus*, Fabr., male, was bred from the egg-sac of a species of *Theridion*. *Methoca ichneumonoides*, Latr.; *Ichneumon luctatorius*, Lin.; *Lissonota bellator*, Grav.; *Theroscopus subzonatus*, Grav.; *Hemimachus instabilis*, Foerst.; *H. fasciatus*, Fabr., male and female, male bred from spider's egg-sac; *Aptesis hemiptera*, Grav.; *A. nigrocincta*, Grav.; *Pezomachus pumilus*, Foerst.; *P. micrurus*, Foerst., new to Britain; *P. zonatus*, Foerst.; *P. corruptor*, Foerst.; *P. insolens*, Foerst.; *P. attentus*, Foerst.; *P. transfuga*, Foerst.; *P. tener*, Foerst.; *P. Mülleri*, Foerst.; *P. Kiesenwetteri*, Foerst.; *P. festinans*, Grav.; *Spathius clavatus*, Nees; *Chasmodon apterus*, Nees.—Rev. O. PICKARD-CAMBRIDGE; Blandford, Dorset, May 5, 1881.

HYMENOPTEROUS PARASITES OF LEPIDOPTERA.—Many bred specimens of parasitic Hymenoptera have passed through my hands during the last year. It is necessary their record should be preserved for other and future workers; still I may say that already the knowledge gained of habits and economy is likely to lead to very useful results. Nearly all the specimens of *Ichneumonidæ* have been examined, and many determined, by Mr. Bridgman. This list is uniform with last year's (Entom. xiii. 67), the names in the parentheses being those of the correspondents who have bred the species. Several specimens still stand over for further consideration; and it is somewhat useless, at present, giving specific names to the large numbers and numerous species of *Pteromalidæ*, *Entedonidæ*, *Elachistidæ*, &c., bred by Messrs. J. Sang, G. Elisha, and others, from various *Lithocolletidæ* and *Nepticulidæ*. Walker is very difficult to follow, but the specimens will all be carefully preserved, and at the disposal of any future worker at the interesting *Chalcididæ*, which group, I may state by the way, certainly *ought* to be taken up in this country, considering the vast amount of material we possess. Nearly all the *Microgasteridæ* and *Perilitidæ* are named by Dr. H. Reinhard, of Dresden. Altogether the list includes thirty-five species of *Ichneumonidæ* and *Braconidæ* new to Britain; their names are printed in small capitals. Many of these are referred to, and a few described in Mr. Bridgman's paper, now publishing in the current part of the Trans. Ent. Soc. (pp. 143–168, plate viii.):—*Ichneumon lineator*, F., from *Gortyna flavago* (J. Sang); low plant-feeding Noctua (G. T. Porritt).

I. impressor, Zett., from *Gortyna flavago* (J. B. Bridgman).

I. trilineatus, Gml., from *Abraxas grossulariata* (G. C. Bignell).

I. multiannulatus, Gr., from *Noctua brunnea* (Bignell).

I. gracilentus, Wesm., from *Tryphæna fimbria* (H. M. Golding-Bird, Bignell).

I. saturatorius, L., from *Nonagria typhæ* (E. A. F. and Fitch, Bignell).

I. fabricator, F., from *Arylia putris* (Bridgman); *Xylophasia rurea*,
H. adusta or *A. gemina* (Sang).

I. jugatus, Gr., from *Tephrosia extersaria* (Bignell).

Exophanes occupator, Gr., from *Nonagria sparganii* (W. R. Jeffrey).

Amblyteles armatorius, Forst., from *Tryphæna promuba* (E. A. Butler).

A. oratorius, F., from *Aplecta nebulosa* (Bignell).

A. HOMOCERUS, Wesm., from *Argynnis Paphia* (Bignell).

Eurylabus dirus, Wesm., from *Eriogaster lanestris* (Bignell); bred by Mr.

T. Wilson, possibly from *E. lanestris*.

- E. larratus*, Christ, from *Stauropus fagi* (F. D. Wheeler, Bridgman).
Platylabus pedatorius, F., from *Eupithecia subnotata* (Golding-Bird).
P. THEDENII, Holmgr., from *Emmelesia unifasciata* (G. Elisha).
Phæogenes candidatus, Gr., from *Tortrix viridana* (Bignell).
Ischnus nigricollis, Wesm., from *Pterophorus (Acipitilia) galactodactylus* (C. G. Barrett, Bridgman).
Stilpnus deplanatus, Gr., from larva feeding on honeysuckle (Butler).
Cryptus obscurus, Gr., from *Hadena thalassina* or *Noctua plecta* (Sang).
C. rufiventris, Gr., from *Talæporia pseudobombycella* (J. E. Fletcher).
C. migrator, F., var. from *Euchelia Jacobea* (Sang).
C. junipennis, Gr., from *Saturnia carpinii* (Barrett, Bridgman).
Mesostenus obnoxius, Gr., from *Zygæna jilipendula* (W. Bennett, Butler, E. A. F.).
Hemiteles fulvipes, Gr., from *Vanessa Atalanta* (Bridgman); *Plusia chrysitis* (V. R. Perkins). Probably hyperparasitic.
H. castaneus, Tasch., female, from *Exæretia Allisella* (Sang).
H. sp.? from *Dianthæcia capsincola* (Bignell).
H. sp.? from *Lithocolletis Schreberella* (E. Parfitt).
APTESIS VESTIGIALIS, Foerst., from *Coleophora solitariella* (G. C. Champion).
 Non *A. Hopei*, Entom. xiii. 68.
Hemimachus palpator, Gr., male, from *Coleophora melilotella* (S. Webb); *Eupæcilia atricapitana* (Barrett, Bridgman).
H. rufocinctus, Gr., male, female, from *Coleophora genistæ* (Fletcher).
 Female from *Gracillaria phasianipennella* (Sang).
H. fasciatus, F., male, female, parasitic on *Microgasteridæ* (F. Norgate, J. B. Bridgman).
Pezomachus insolens, Foerst., female, from *Saturnia carpinii* (Barrett, Bridgman).
P. PROCURSORIUS, Foerst., male, with cocoon (? *Microgasteridæ*), bred 2nd August, 1880 (Bignell).
P. n. s.? female, from *Coleophora melilotella* (Sang).
P. n. s.? female, near *fraudulentus*, Foerst., from *Coleophora artemisiella* (Sang).
Ophion luteum, L., from *Leucania lithargyria* (Butler); *Hadena pisi* (H. Marsh).
Anomalon fibulator, Gr., from *Zygæna lonicera* (W. P. Weston).
A. clandestinum, Gr., from *Hemiteles thymiaris* (Bignell); *Eupithecia linariata* (Barrett, Bridgman).
Agrypon tenuicorne, Gr., male, from *Dianthæcia capsincola* (Bignell).
A. canaliculatum, Ratz., from *Pædisca sordidana* (Sang).
Paniscus cephalotes, Holmgr., from *Dicranura vinula* (Wilson).
P. testaceus, Gr., from *Hadena pisi* (Marsh).
P. TARSATUS, Brischke, from *Eupithecia abbreviata* (Bignell).

- Campoplex mixtus*, Gr., from *Pygæra bucephala* (F. Norgate, Bridgman).
C. pugillator, L. ? from *Corycia temerata* (Bignell).
C. orbitalis, Gr., from *Abraxas grossulariata* (Weston).
Casinaria mesozosta, Gr., from *Nudaria mundana* (Barrett, Bridgman).
C. vidua, Gr., from *Abraxas grossulariata* (Bignell); *Zygæna trifolii* (Weston).
C. tenuiventris, Gr., from *Hemithea thymiaria* (Bignell, Butler).
Limneria aberrans, Gr., male, ? from *Laverna conturbatella* (G. Elisha).
L. BARRETTII, Brdg., from *Pterophorus (Oxyptilus) teucris* (Barrett).
I. CARBONARIA, Brischke, from *Cidaria pyraliata* (Bignell).
L. cerophaga, Gr., from *Gracillaria stigmatella* (Sang).
L. CLANDESTINUM, Holmgr., from *Lomaspilis marginata* (Bignell).
L. CLAUSA, Brischke, from *Hybernia progemmaria* (Bignell).
L. COXALIS, Brischke ? from *Eupithecia rectangulata* (Bignell).
L. crassicornis, Gr., from *Leucania lithargyria* (Parfitt).
L. DEFICIENS, Gr. ? from *Eupithecia pulchellata* (Cifton, Bignell).
L. difformis, Gml., from *Lomaspilis marginata* (Bignell).
L. erucator, Zett., from *Penthina gentianana* (Bennett, Butler).
L. femoralis, Gr., from *Coleophora lineolea* (Bridgman ; Fitch).
L. fenestralis, Holmgr., from *Botys verticalis* (Bignell); *Depressaria hypericella* (Elisha).
L. FITCHII, Brdg., from *Nola albulalis* (Bignell).
L. majalis, Gr., from *Botys verticalis* (Porritt).
L. melanosticta, from *Lampronia prælatella* (Parfitt).
L. mæsta, Gr., from *Hybernia progemmaria* (Bignell); II. *defoliaria* (Bignell).
L. MONTICOLANA, Brdg., from *Elachista monticola* (Sang).
L. mutabilis, Holmgr., from *Ebulea sambucalis* (Bridgman); *Sciaphila virgaureana* (Sang); *Penthina gentianana* (Butler); *Notocelia Udmaniana* (Barrett, Bridgman).
L. nana, Gr., from *Laverna conturbatella* (Elisha); *L. epilobiella* (Fletcher).
L. obscurella, Holmgr., from *Orgyia antiqua* (W. Bennett, Butler); *Hemithea thymiaria* (Bignell).
L. Paniscus, Gr., from several *Lithocolletes* (Sang).
L. ruficincta, Gr., from *Dianthecia irregularis* (Mrs. Hutchinson, Bignell).
L. tibialis, Gr., from *Gracillaria phasianipennella* (Sang).
L. TRICINCTA, Gr., from *Ebulea stachydalis* (Barrett, Bridgman).
L. tumidula, Gr., from *Glyphipteryx Haworthana* (Wheeler, Bridgman).
L. VOLUBILIS, Holmgr., from *Coleophora laricella* (Elisha).
L. N. S., male, from *Elachista cerussella* or *Triatomella* (Sang).
L. sp. ? male, from *Lithocolletis tenella*, *Bremiella*, or *betulavorella* (Sang).
Cremastus infirmus, Gr., from *Carpocapsa splendana* (E. A. F.).
C. bellicosus, Gr., from *Psyche villosella* (M^ræ).

- Mesochorus sericans*, Curt.? from *Abraxa grossulariata* (Bignell).
M. semirufus, Holmgr., captured piercing *Eupithecia castigata* (Bignell).
M. sylvanum, Hal., from *Apanteles* on *Vanessa Atalanta* (Bignell).
M. olerum, Curt., female? from *Gracillaria phasianipennella* (Sang).
M. GRACILENTUS, Brischke, female, from *Gonepteryx rhamni* (Bignell).
M. ACICULATUS, Brdg., female, from *Apanteles* on *Pieris brassicae* (Bignell).
M. sp.? from *Melanippe galiata* (Bignell).
M. sp.? from *Abraxa grossulariata* (Bignell).
Exetastes osculatorius, F., from *Mamestra brassicae* (Bignell); *Miana furuncula* (S. L. Mosley, S. D. Bairstow).
E. illusor, Gr., from *Mamestra persicariae* (Weston).
Banchus pictus, F., from *Selenia illunaria* (Bignell).
Mesoleptus testaceus, F., from *Eupithecia castigata* (Bignell).
Exochus prosopius, Gr., from a Tortrix (Butler).
E. alpinus, Zett., from black Tortrix larva on honeysuckle (Bignell).
Bassus nigritarsus, Gr., from *Bombyx quercus* (Bignell).
B. elegans, Gr., from *Gracillaria phasianipennella* (Sang).
PIMPLA DILUTA, Ratz., from *Pyrameis cardui* (Barrett, Bridgman).
P. instigator, F., from *Diphthera Orion* (Wheeler, Bridgman).
P. examiner, F., from *Tortrix viridana* (Bignell); *Ornix torquilella* (Sang).
P. flavonotata, Holmgr., from *Tortrix viridana* (Bignell).
P. scanica, Vill., from *Tortrix viridana* (Bignell); *Argyresthia nitidella* (Sang); *Gracillaria stigmatella* (Sang).
P. stercorata, F., from *Eupithecia linariata* (Bignell).
P. brevicornis, Gr., from *Gelechia intaminatella* (Sang); *Coleophora melilotella* (Webb).
Glypta scalaris, Gr., from *Ypsipetes elutata* (G. H. Raynor).
Lissonota maculatoria, F., from *Phycis Davisella* (? *genistella*, Dup.) (Mrs. Hutchinson, Bignell).
L. CALIGATA, Gr., from *Anticlea badiata* (Bignell).
Phytodietus segmentator, Gr., from *Pædisca sordidana* (Sang).
P. coryphaeus, Gr., from *Tortrix viridana* (Bignell).
Bracon minutator, F., from *Parasia carlinella* (Elisha).
B. sp.? from *Pædisca solandriana* (Elisha).
Spathius clavatus, Panz., from "probably *Sericoris littorana*" (Barrett).
 Query error, as this species is a general parasite of *Anobium* and allies.
Chremylus rubiginosus, Ns., from *Tinea granella* (Perkins).
PETALODES UNICOLOR, Wesm., from *Clostera reclusa* (Norgate, Bridgman).
Rhogas reticulator, Ns., from *Odonestis potatoria* (Bignell).
R. circumscriptus, Ns., from *Ebulca crocealis* (Bignell).; *Thera firmata*,
T. variata or *Ellopija fasciaria* (Sang).
Chelonus sp.? from *Elachista monticola* (Sang).

- Ascogaster similis*, Ns., from *Penthina gentianana* (Elisha).
Microgaster subcompletus, Ns. (*annulipes*, Curt.), from *Vanessa Atalanta* (Bignell); *Euchelia Jacobæ* (Butler).
M. alvearius, Fab., Spin., from *Boarmia rhomboidaria* (Bignell).
M. flavipes, Hal., from *Boarmia repandata* (Bignell).
M. MINUTUS, Rhd., from *Cleora glabraria* (Elisha; Billups; Butler; E. A. F.).
M. PUBESCENS, Ratz., from *Thera variata* (= *obeliscata*) (Bignell).
M. connexus, Ns., from *Liparis auriflua* (E. A. F.).
Microplitis ocellata, Bè. (= ? *ingratus*, Hal.), from *Smerinthus ocellatus* (Bridgman; B. Brown; E. A. F.); *S. populi* (Bignell; T. Wilson; E. A. F.).
M. TUBERCULIFER, Wesm., from *Polia flavocincta* (Bignell).
APANTELES SOLITARIUS, Rtz. (? = *lincola*, Curt.), from *Tæniocampa stabilis* (Bignell); *Orgyia antiqua* (Bignell).
A. ruficrus, Hal., from *Plusia iota* (Perkins; Bignell); *P. chrysitis* (Bignell); *Plusia* larva on *Lamium album* (Butler).
A. congestus, Ns. (= *intricatus*, Hal.), from *Tryphæna pronuba* (Bignell).
A. rubripes, Hal., from *Geometra papilionaria* (Bignell); *Cabera pusaria* (Bignell); ? *Notodonta ziczæ* (Bignell).
A. glomeratus, L., from *Pieris brassicæ* (generally).
A. SPURIUS, Wesm., from *Satyrus Hyperanthus* (Butler); *Amphydasis betularia* (Bignell).
A. juniperatæ, Bè., from *Zygana filipendulæ*, *Selenia illunaria*, *Hybernia defoliaria*, *Ephyra punctaria*, and *Cidaria fulvata* (Bignell).
A. difficilis, Ns. (= *vestalis*, Hal.), from *Arctia caja* (Billups; E. A. F.); *Euchelia Jacobæ* (Bignell); *Selenia illunaria* (Butler); *Amphydasis prodromaria* (Bignell); Geometer feeding on hazel (Butler); *Hadena pisi* (Mrs. Walker, Bignell).
A. TENEBROSUS, Wesm., from *Acrolepia pygmæana* (Bignell).
A. PALLIPES, Rhd., from *Plusia chrysitis* (Billups).
A. bicolor, Ns. (= *exiguus*, Hal.), from *Lithocolletis lantanella* (Elisha, Billups); *L. scopariella* (Sang).
A. FORMOSUS, Wesm., var., ? from *Ourapteryx sambucaria* (Bignell).
A. vitripennis, Curt., Hal., from *Diloba cæruleocephala* (Laddiman, Bridgman).
A. fulvipes, Hal., from *Liparis auriflua* (Butler; E. A. F.); *Cidaria fulvata* (Butler); *Tryphæna orbona* (Bignell; E. A. F.); *Noctua xanthographa* (Bignell); *Catocala nupta* (Butler); *Elachista paludum* and *E. cerussella* (Sang); various *Lithocolletidæ* (Sang; Elisha).
A. NOTHUS, Rhd., n. s., from *Melanippe galiata* (Bignell; R. M. Sotheby, Butler); *Cidaria pyraliata* (Bignell); *Geometra* sp. ? (Bignell).
A. N. S., from *Chilo phragmitellus* (Porritt).

- Hybrizon buccatus*, Bréb., from *Plusia chrysitis* (Billups).
Zemiotos albiditarsus, Curt., from *Trachea piniperda*? (Bridgman). Fluffy ochreous cocoon.
Perilitus (*Meteorus*) *deceptor*, Wesm., from *Crocallis elinguaris* (Bignell); Geometer feeding on hazel (Capron).
P. ictericus, Ns., from *Hemithea thymiaris* (Butler).
P. PULCHRICORNIS, Wesm., from *Cheimatobia brunata* (Bignell).
P. scutellator, Ns., from *Taniocampa stabilis* (Bignell).
P. scutellator, var., from *Thecla W-album* (Perkins).
P. unicolor, Wesm., from *Clostera retusa* and *Orthosia lola* (Bignell).
P. MEDIANUS, Rthe., from *Agrotis tritici* (Bignell); *Leucania lithargyria* (Butler).
P. fragilis, Wesm., from *Miselia oxyacanthæ* (Butler).
Zele testaceator, Curt., from *Leucania obsoleta* (Butler); ——— (Bignell). Thin, smooth, white cocoon.
Macrocentrus linearis, Ns., from *Botys verticalis* (Porritt).
M. linearis var. *pallipes*, Ns., *Hypermarcia angustana* (Sotheby); *Depressaria nanatella* (Elisha); *Gelechia Mouffetella* (Elisha).
M. marginator, Ns., from *Xylophasia rurea*, *H. adusta*, or *A. gemina* (Sang); *Catoptria hypericana* (Elisha).
Eulophus ramicornis, Geof., male, female, from *Demas coryli* and *Notodonta camelina* (Billups).
Eulophus sp.? female, from *Hybernia rupicapraris* (Bignell).
Copidosoma chalconotum, Dalm., male, female, from *Depressaria nervosa* (Bignell; E. A. F.).
Holcothorax testaceipes, Ratz., from oak *Lithocolletidæ* (Sang).
Encyrtidæ from *Semasia rufillana* (Sang); *Cemiostoma laburnella* (Elisha), &c.
—EDWARD A. FITCH; Maldon, Essex.

CONTRIBUTION TO THE LIFE-HISTORY OF THE 'TORTRICIDÆ':
 PENTHINA POSTREMANA BRED.—At page 283, vol. xiii., of the 'Entomologist,' I described the larva of *Penthina postremana*, found by me last autumn near Belle Grange, on the banks of Windermere Lake, and can now add that the larva lived throughout the winter within the stems of its food-plant. In April it appears less stout (not so fat) than when it ceased to feed in autumn, but is much more active; that is it moves much faster up or down the stem in which it has hybernated. A little later it makes somewhat pellucid diaphragms, or slight partitions, in the stem, and changes to an elegantly formed rich sienna-coloured chrysalis between the partitions it has made within the stem, and appears in all its beauty in the perfect state about 9 o'clock on warm mornings about the middle of May. It is of dull

sluggish habits as an insect in the perfect state. Whilst eating and growing during autumn the larvæ live within the stems and root of the plant, eating the pith. When the plants begin to decompose, the interior of the stems in which the larvæ are living become vessels full of water. This distressed me much, as I feared the larvæ would be drowned, but they seem rather to enjoy it. As the liquid dries up they are equally at home and comfortable for the next four months within the dry stems, laying dormant until the warmth of spring calls them to complete their metamorphosis.—C. S. GREGSON; Liverpool, May 22, 1881.

ENTOMOLOGICAL NOMENCLATURE.—I must say I protest against the useless and unscientific method of giving person's names to species; and I quite agree with Mr. C. A. Briggs when he says that if such names are occasionally given they should only be taken from leading or very energetic entomologists deserving such a reward, for as such it ought to be given, and then only to those who recognise the great honour conferred upon them.—E. A. BRUNETTI; 15, Lower Grosvenor Place.

NOTICE OF NEW BOOK.

The Butterflies of Europe. Illustrated and described by HENRY CHARLES LANG, M.D., F.L.S., &c. London: L. Reeve & Co.

WE have received a specimen plate and circular of this promising work. The plates will be prepared by Messrs. West, Newman & Co., and those already produced are an example of the very fine colour-printing of Natural History subjects executed by that firm. It is evident this will become the standard work upon the subject, and, being issued in parts, it will be within the reach of every entomologist. Each monthly part will contain four coloured plates, and sixteen pages of letterpress. It is intended to represent both upper and under sides, where necessary, of the butterflies, as well as the more important named varieties, and larvæ, &c., when possible. It is estimated that the work will be complete in twenty parts, which are charged 3s. 6d. each part. We hope the work will command the circulation it deserves, and that it will give an impetus amongst English entomologists to the study of insects other than those inhabiting these islands.—ED.

ERRATUM.—In our last number, p. 115, line 16 from foot, for "ATTACUS LUNA" read "ATTACUS SELENE."

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JULY, 1881.

[No. 218.

JOHN BLACKWALL, F.L.S.

(OBITUARY NOTICE.)

ON the 11th of May, 1881, and in the ninety-second year of his age, a veteran in natural science, John Blackwall, passed away from us. The gap made by the loss of a scientific worker at so advanced an age is perhaps less (at any rate it is usually less immediately felt) than that created by the death of one called away in the prime of life and in the midst of work; still the loss we are now deploring is great, and cannot but be very deeply felt both by science and the more immediate circle of friends and relations. Few lovers of Natural History have enjoyed the advantages of leisure and locality in the abundance enjoyed by the late Mr. Blackwall. From a very early date the ties of professional business gave way to those merely of family affairs, though few, even so disengaged, have left so many marks behind them of an active scientific mind and patient observation.

Mr. Blackwall was descended from an old Derbyshire family, taking its name and rise from Blackwall (or Blackwell) in that county; but the family had, previously to the birth of the late Mr. John Blackwall, migrated to Lancashire, where, at Crumpsall Old Hall, near Manchester, he was born on the 20th of January, 1789. Here the love of Natural History and Science became very early evident in a devotion of his leisure to Ornithology, as well as to Botany, Astronomy, and Meteorology, on all which subjects he has left published records.

Various phenomena connected with spiders and their webs, particularly in the form of gossamer, led Mr. Blackwall to turn

his attention to the little spinners themselves; but to his surprise, with the exception of the work, in Latin, of Martin Lister, published by the Royal Society in 1678, he found scarcely any authorities from which the information he so much needed could be obtained. This, however, determined the main lines along which his subsequent Natural History work was directed. Thenceforth, from about the year 1820, if not earlier, the *Araneidea* (or *true* spiders) became the objects of an intensity of interest which never afterwards flagged; even continuing unabated long after defects of sight, and other concomitants of advanced age, prevented any actual work among them. As time went on other works on spiders, notably those of Baron Walckenaer and C. L. Koch, made their appearance, and, as well as their authors, came under Mr. Blackwall's notice; but his singularly retired and unobtrusive life led, in some instances, to a complete and unfortunate isolation from both authors and works in this branch of Natural History; and, with perhaps no more than two or three exceptions, Mr. Blackwall's labours were for a long time equally unnoticed, even probably unknown, by foreign workers. Thus, to note one instance only, the materials for the great work of this portion of Mr. Blackwall's life, his 'History of the Spiders of Great Britain and Ireland,' were accumulating, *pari passu*, with those in Sweden of Nicolas Westring, for his invaluable work, '*Aranæ Suecicæ*,' the two works being published in the same year, 1861; and yet these two authors were, up to that time, wholly unknown to each other, either by correspondence or in the results of their several labours. Working on, almost wholly unaided by any other English worker, for forty or more years, in the investigation of the spiders of his own immediate localities, and their habits and economy, Mr. Blackwall published, besides an independent work, 'Researches in Zoology' (1834), (chiefly occupied by very interesting chapters on ornithological subjects), numerous papers on Araneology in different Natural History and scientific journals, recording many species of spiders met with, and the observations made upon them. It may not be uninteresting to note these papers in some detail, as a proof of this constant and unwearied work. Among the earliest papers published on spiders are *six* which appeared in vols. iii., viii. and x., Edinb. Philosoph. Mag., 3rd ser., 1833—36 (some of the contents of the

earlier of these papers were reprinted in 'Researches in Zoology'. Contemporaneously with some of these, and also following them, were *six other papers* in Trans. Linn. Soc., vols. xvi., xviii., xix. and xxi. (1833—1855). Meanwhile, with a view to stirring up an interest in the study of our indigenous spiders, *fifteen articles* from Mr. Blackwall's pen appeared in the Annals and Mag., N. H., 1851—1857, giving a catalogue of all the then known British spiders, with remarks on their structure, functions, economy and systematic arrangement. It was during the publication of some of the later of these articles that—through Mr. R. H. Meade, of Bradford, Yorkshire—I first became acquainted with Mr. Blackwall; in fact it was chiefly owing to an interest awakened by this series of articles that I was myself first induced to take up the study of spiders; and from that time, to a short time only before his death, our correspondence on this subject was constantly carried on. It is scarcely necessary, at any rate for those who knew Mr. Blackwall, to say that he never spared time or trouble, and frequently cost also, in giving his most valuable, and valued, assistance.

Besides the papers and articles already noted, *thirty-three others* connected with spiders appeared in the Annals and Mag., N. H., 1841—1847; *three* in Journ. Linn. Soc., vol. vii. (1864) and vol. x. (1870). Mr. Blackwall also contributed papers to the Proceedings of the British Association for the advancement of Science in 1833, 1842, and 1844; the last of these appeared under the title of "Some recent researches into the structure, functions and economy of the Araneidea, made in Great Britain." Among the latest publications from Mr. Blackwall's pen is one on the spiders of the Seychelle Islands; this appeared in the Proc. of the Roy. Irish Acad., 2nd ser., vol. iii., 1877. It had, however, been written in 1871 or 1872; and in 1877, in the then declining state of the author's health, this paper was, by his own wish, submitted to myself for such revision as might be needed, owing to the changes in the state of araneological science since it was penned. A short paper, entitled "A concise notice of observations on certain peculiarities in the structure and functions of the Araneidea," appeared in the Annals and Mag., N. H., 1874. This is, I believe, the last that proceeded from his pen.

The above brief summary shows how constantly and actively Mr. Blackwall was engaged in his favourite branch of natural

science up to the great age of, at least, eighty-six years. His interest in the subject, however, by no means ended then, for I myself continued to receive letters from him upon it up to September 18th, 1879. This is the date of his last letter, and in this letter he kindly permits me to dedicate to him a work then in the press, 'The Spiders of Dorset,' of which the second (and concluding) part was published only a few days after his decease.

Anything like a minute account or criticism of Mr. Blackwall's works is impossible here. Without a doubt his chief work is that published by the Ray Society, 1861—64. This appeared under circumstances of great disadvantage: not only had the MS. been in the hands of that Society for ten years before it was published, but just at a most critical point the serious and prolonged illness of Mr. Tuffen West, the artist engaged upon the plates, threw the whole into a confusion, from which it was my own happiness and privilege to be able to lend a hand in its extrication. This Work sums up all Mr. Blackwall's previous labours in the investigation of British spiders; and if it has not served to advance, as much as from its own merit it ought to have done, the popularity of Araneology in England, this may be set down mainly to its unwieldy size—large folio, to its great cost, and the difficulty of getting copies of it.

With regard to the quality of Mr. Blackwall's works in general, evidences are everywhere abundant of a clear and logical mind, most conscientious and painstaking in the elucidation of facts by actual experiment and in the description of details. To the ordinary reader these details may be perhaps at times somewhat wearisome, and bearing the appearance of unnecessary repetition; but to the scientific student they present an almost photographically-true picture of the object under notice. This character in the descriptions of our spiders in the Ray Society's volume has been objected to as a defect, and as hindering the popularity of the work; but although a certain amount of breaking-up into paragraphs would have made these descriptions more easy of reference, yet such real objection as there may be in this goes merely to the *manner*, not to the *matter*, of the work. There can be no hesitation in saying that taken in consideration with its actual date (which, as before observed, must be set at least ten years previous to publication) and with the disadvantages of isolation from other authors and

works, this volume on the spiders of Great Britain and Ireland will yet go down to posterity, both in England and in foreign countries, as one indispensable to every student of Araneology.

It should be mentioned that in the investigation of the structure of spiders Mr. Blackwall almost entirely lacked the help of a good microscope, nearly all his work being effected by means of a strong pocket-lens; yet he was the first observer who ascertained and used the minute and often complex structure of the male palpi of spiders as a most important character for the determination of very similarly coloured and closely allied species. This use of the palpi, although abundantly taken up since by all continental araneologists, has never, I believe, been credited to its discoverer as it should have been.

Mr. Blackwall's labours in British Araneology would, doubtless, have become more completely serviceable to students and collectors if he had paid greater attention to the formation of a *collection* of British spiders. His habit was, when new or rare species were found and described, to place the type specimens in "magazine bottles," all mixed together, with perhaps hundreds of others of common species: this rendered it a very tedious matter to hunt out and refer to any particular specimens, besides subjecting them to injury and great liability to loss. Thus, as might be imagined, some unique examples were not forthcoming at all for the illustration of the 'History of British Spiders'; and very many more, placed in the artist's hands for this purpose, were mislaid, and eventually lost and destroyed during the illness of the latter, above referred to. In extenuation of this want of care in preserving his types, it should be remarked that the present very satisfactory method of keeping spiders separated in glass-tubes was unknown at the period of Mr. Blackwall's most active operations, being due to Mr. R. H. Meade in 1852 (see 'Zoologist,' 1852, p. 3676).

It will have been gathered from what has been said that Mr. Blackwall's chief investigations were occupied with *British* spiders; descriptions, however, of numerous *exotic* species are contained in some of the papers above recorded, but these have never been brought into any systematic or connected form.

Although Mr. Blackwall may (without the remotest idea or intention of reproach) be classed among naturalists of the "old school" of thought, yet his mind was of a truly fair and just

calibre, and could fully enter into the positions and arguments of the more modern school. It happened to myself to be staying with him in 1860, just after the appearance of Mr. Darwin's work on the 'Origin of Species,' many points in which became the subject of long and frequent discussion between us. Although Mr. Blackwall could not see his way to an acceptance of Mr. Darwin's views, yet their importance as offering a theory for the solution of problems hitherto insoluble on any scientific hypothesis struck him as worthy of the closest attention of every naturalist. His idea, at that time, was that Mr. Darwin's views were more assailable on psychological than on other grounds. He appeared to be impressed with a conviction that if the theory of "natural selection" be a true one, it must be true psychologically as well as physically.

It has been already remarked that Mr. Blackwall's early life was passed in Lancashire; from thence his residence was transferred to North Wales, where, first at Oaklands (about 1832), and afterwards (from about 1854) at Hendre House, near Llanrwst, and not far from the picturesque district of Bettws-y-coed, the remainder of his long life ran out. Although attaining so great an age, Mr. Blackwall was in this respect outdone by his father, who reached the still greater age of ninety-four years.

It should be noted that as lately as 1873 Mr. Blackwall published a second edition of his 'Researches in Zoology'; but, so far as I am aware, the chief difference between this and the first edition consists of the omission of the numerous technical descriptions of spiders, which had become out of place by their incorporation, meanwhile, in his 'History of British Spiders.'

It will be a source of happiness to all who knew him to hear that, although weighed down by great physical prostration, his usual strength and clearness of intellect remained to the last, and the end of the long life, we have been thus very inadequately noticing, came as calmly, quietly, and peacefully, as its many days had passed by. His family and friends have to mourn a good man, and the scientific world a bright ornament.

Mr. Blackwall had been a member of the British Association for the advancement of Science from the commencement, and was at his death very nearly the oldest Fellow of the Linnean Society, having joined it April 17th, 1827.

O. PICKARD-CAMBRIDGE.

Bloxworth Rectory, near Blandford, Dorset, June 18, 1881.

THE NEW INSECTARIUM AT REGENT'S PARK.

BY JOHN T. CARRINGTON, F.L.S.

THE Zoological Society is to be congratulated upon its enterprise in establishing, on a large scale, a house to be devoted to the rearing and exhibition of insects during different stages of their metamorphosis. The idea is not quite new, and has been tried in other places with varying success. A few years ago, as a trial, I had a large case constructed, with a number of compartments, for the purpose of rearing insects in this Aquarium. I soon found, however, that we had to contend with two very serious enemies. First were the emanations from the very large quantity of gas used in the building. Some idea of this quantity may be gathered from the fact that gas has cost as much as £190 per week in winter, varying to £60 per week in summer, for illuminating this establishment. Our other trouble was the frequent extremes of temperature. Often just before closing the Aquarium the heat gets up to 85° or 90° , when two hours later the same thermometer will register no more than 40° . Notwithstanding these difficulties many interesting species, both British and exotic, have been successfully reared; but some of our commonest and apparently most hardy Lepidoptera have utterly failed, while others reputedly difficult to rear have come to maturity with little difficulty. One of the most unfortunate has been *Chelonia caja*. Out of many hundreds of larvæ not one per cent. ever came to the imago state, while in the next compartment was its ally, *C. dominula*, every larva of which seemed to produce a moth. It therefore appears that to establish such educational and interesting institutions as Insectaria, the first consideration should be locality and fresh air. In this the Zoological Society has comparatively every advantage.

The elegant conservatory erected on the north bank of the canal which intersects the Society's gardens has the full advantage of any sunlight which may shine in our usually sunless neighbourhood. This light can be controlled by means of blinds, while artificial heat is supplied by hot-water pipes. The building having been specially built for the purpose for which it is intended is oblong in shape, and is provided with stands or tables, upon which rest separate perforated zinc and other cages for

rearing lepidopterous and other larvæ. At present there are twenty-six of the former. Twelve of the larger of these are devoted to tropical species of Lepidoptera, chiefly the large silk-producing Bombyces. In the smaller cages may be seen many species of the more familiar British butterflies and moths in various stages of their existence. There are also shown in others foreign examples of some of our rarest species, such as *Catocala fraxini*, &c.

Amongst the species exhibited at the present time are the very beautiful *Samia Gloveri* from Utah, a fine lot of larvæ feeding upon gooseberry. *Attacus Cynthea* and *A. Pernyii* are also feeding in the larval state, the latter species being little under three inches in length. Fine imagines of *Attacus Atlas* have been emerging from pupæ for some time past, as have *A. Luna* and *A. Silene*. *Bombyx Yama-Mai* were occupied in making cocoons and preparing to pupate. This usually difficult species to rear has apparently found its surroundings suited to its welfare, for a nice batch looked in healthy condition. *Saturnia pyri* were just hatching from the ova on the day of my visit, and the little larvæ were evidently satisfied with their commissariat.

Leaving these "silk-producers," and crossing to the European side of the house, may be found *Papilio Machaon*, *Limenitis Sibylla*, *Apatura Iris*, and *A. Ilia*, imagines of which have all been reared from larvæ. Near these are the *Chelonidæ*, which seem to have found more congenial quarters than at Westminster. *Lasiocampa quercifolia* was represented by several large moths. In the next cage were *Cossus ligniperda*, which, after drilling a hole through a piece of willow wood, were comfortably resting in the pupa state.

In the centre of the room is a large table, upon which were placed glass vases, containing aquatic insects; near these were glass tubes and other structures, with various small larvæ and ova of insects. Amongst the former were some interesting larvæ of Neuroptera (dragon-flies). The ant lion larvæ have their pits beautifully made in sand placed in a suitable glass vessel; ants are given to these ferocious little creatures for food. It is interesting to see them throw up the sand, whilst the unfortunate ant falls down the pits, and into the jaws of the adversary. Next these are some very beautiful nests of *Mygale cæmentaria*

from Mentone, which have been presented by Mrs. Priestly. A tube contains some larvæ of *Heterogynis penella*, presented by Lord Walsingham, from Monte Carlo. The Trichoptera are represented by several caddis-flies larvæ in their pretty cases.

A good feature of the exhibition is, in many instances, the association of all stages of insects. This is attained by placing a neat little box containing prepared specimens of the remaining transformations of the living examples shown in the cage beneath.

Amongst the orders hitherto represented in this house, Lepidoptera, as might be expected, have held the first place. The larvæ are so much better known, and in many instances more easily managed, that they naturally command the most favour. It is, however, to be hoped, now such an institution has come into existence, the primary object of which is to be educational, that opportunities for studying less worked groups may be extensively afforded. Much more will be learned by visitors seeing living insects, such as ants, bees, &c., at work, than by occasionally reading popular works, or even less trustworthy articles in magazines and newspapers.

It is pleasing to find that the visitors to the Gardens do take an interest in the Insectarium, for it is seldom, during the authorised hours, without visitors, and is frequently unpleasantly crowded.

The new house has been arranged and stocked by Mr. W. Watkins, who has been most successful in rearing various larvæ; and the whole place looks smart, clean, and well cared for. It is curious and amusing to walk after Mr. Watkins as he goes from cage to cage, explaining their contents to the numerous visitors, and to listen to their remarks, some pertinent, whilst others make one feel sad at the dense ignorance of well-dressed and "educated" people.

Royal Aquarium, Westminster, S.W., June 21, 1881.

TORTRIX LAFURYANA, Ragonot.

A SPECIES NEW TO THE BRITISH FAUNA.

WHILST collecting Micro-lepidoptera a few miles from this town, in July last year, I beat out two specimens of a Tortrix, which I was unable to name. I sent them to Mr. C. G. Barrett,

who has kindly informed me that they were male and female *Tortrix Lafauriana*. They were taken in a boggy portion of a heath.

E. A. ATMORE.

8, Union Street, King's Lynn, Norfolk,
June 11, 1881.

[We have not seen this species, but, in a contemporary, Mr. C. G. Barrett says:—" *Tortrix Lafauriana* was described by M. Ragonot in the Ann. Soc. Ent. France, 5^{me} série, vol. vi., p. 403 (1876), and also figured. He says that it has been confounded with *Croceana*, Hüb., from which it may be easily distinguished by the costal fold in the male; also that it is allied to *Sorbiana*, forming a passage from it to the species with pale hind wings. His description is long, and it will be sufficient to say that *Lafauriana* has a folded and strongly arched costa, hollowed before the apex, the male resembling *Sorbiana*, but with shorter wings and yellower colouring; the female approaching more in colouring to *Heparana*. The fore wings in both sexes are glossy, and the hind wings of a decidedly pale grey. One of Mr. Atmore's specimens agrees most accurately with M. Ragonot's types; the other is redder, and more like the female in colour. The locality given by M. Ragonot is Dax (Landes), France. The larva, which he describes as variable, feeds there on *Myrica Gale*, joining together the terminal leaves, and is very subject to parasites. The species has since been discovered in Holland (*vide* 'Tijdschrift voor Entomologie,' vol. xxii., p. 128)." The proper position in our collections for this important addition to our list is between *Tortrix sorbiana* and *T. rosana*.—ED.]

COLLECTING IN NORTH DEVON.

BY RICHARD SOUTH.

ENTOMOLOGISTS who would investigate the insect fauna of North Devon must be prepared to freely exercise their locomotive muscles, for they will have some stiff hills to breast, and for the curiosity of the natives. The first may be dispensed with to a certain extent if they are fortunately in possession of a long purse, for then they can ride to their hunting grounds. The second contingency is a matter not so easily dealt with: the fact of a man wandering along in the hot sunshine with a green bag,

or poking about the hedges, ditches, &c., or examining his sugared trees, cannot be reconciled to the mind of the native under any other hypothesis than that the entomologist is "mazed," and as such is regarded accordingly. One good lady imparted the information to her local gossips, in reference to myself, that she "Know'th he be after vearns." The ferns of North Devon are certainly charming, but it would be a simple waste of energy on the one hand, and sweets on the other, to hunt for them with either net or sugar. Another worthy matron, a rural postmistress, whose thirst for knowledge was only excelled by her zeal on behalf of "the property of the postmaster-general," inquired if a small parcel of specimens I wished to be weighed contained cream! As the said parcel was small and under four ounces, the feeling which prompted the query was somewhat evident; so I contented myself by answering in the negative, without stating the nature of contents.

I occupied myself during April and May in "prospecting" the district, and in observing the character of the flora, so that my captures were not numerous. I was only able to work the salallows once or twice towards the end of April. On one of those occasions the bushes were alive with *Scotosia dubitata*, but most of the specimens I examined were faded in colour, though not much worn. A few *Tæniocampa rubricosa*, *T. gracilis*, and one *T. miniosa*, occurred that same evening, together with a host of the commoner species of the genus; also *Eupithecia pumilata*, *E. abbreviata*, and *Lobophora lobulata*. I should state that this was one of the few balmy evenings we had during the month. During May I collected large numbers of larvæ from bilberry and heather, mostly of the Noctuæ group; among them were a few *Agrotis agathina*. The larvæ of *Triphæna fimbria* was abundant, but seemed more partial to the bloom of the wood-sedge or rush (*Luzula sylvatica*).

Most of the hedges in North Devon are formed of beech, with here and there a bush of birch or sallow; others are made of furze, with a sprinkling of hawthorn or broom; but whether of beech or furze, always on the top of a bank of earth faced with stones. This bank is often so covered with heather as to hide the stones; where this is the case, and the hedge itself is of beech, and all in full foliage, the effect is pleasing. About these beech hedges I met with a few *Demas*

coryli, and a nice series of *Ypsipetes ruberata*, and many commoner insects. One *D. coryli* in two nights laid 207 eggs, and the fourth night 40 more; and was a good specimen even after having been shut up in a pill-box so long. On the moors occurred *Phycis carbonariella*, where the heath had been burnt in previous years, and a few *Chelonia plantaginis*. When does this insect fly? The examples I took were started out of the heather. I have not observed the time of its voluntary flight. It is said to fly in the sunshine, so it certainly does; but, according to my experience, only under the gentle stimulus of the beating-stick and the approach of danger. In boggy places on the moor among cotton-grass I got some lovely specimens of *Glyphipteryx Haworthella*.

Among butter-burr (*Petasites vulgaris*), in what is locally termed a "water mead," I got *Ephippiphora turbidana*. The locality where I took this insect is very aptly named as regards water, for this was in plenty, though the mead was not quite so evident at first, till I got well though the water; then I got my mead in the shape of a good bag of *E. turbidana*. I observed that this species flies between 3 and 4 p.m., but only for a short time; after that they may be found sitting on the upper surface of the leaves, singly and in pairs; during the earlier part of the day it is difficult to get a specimen. *Emmelesia albulata* was abundant in grass meadows; and a few *E. affinitata* were met with in ditches among ragged whin. Sugar did not allure anything good enough to box, with the exception of a few dark forms of *Xylophasia rurea* and one *Dianthæcia cucubali*. I have taken the last-named species at sugar several seasons, but it is the only one of the genus so captured by me. As it is my present intention to remain for the whole coming season in North Devon, you will probably hear further from me on my captures.

12, Abbey Gardens, St. John's Wood, N.W., June 12, 1881.

ENTOMOLOGICAL NOTES, CAPTURES, &c.

ORNITHOPTERA BROOKEANA, *Wall.* (Description of female).—As I am not aware that this has yet been published, I give it from a very fine example that has just been sent me, captured in Perak, in the Malayan Peninsula:—Expanse (the wings being horizontal and straight) exactly seven inches and a half; my

largest male being just seven inches. Form of wings as in male, the black less pure, inclined to smoke-brown: above—fore wings as in male, save that the triangular feather-like spots of metallic green are on the submedian nervure, the three median nervules, and on the posterior side of the second discoidal, but on the anterior side of this last and on both sides of the subcostals the feathers are white, reaching far up towards the cell, and becoming impure towards the points; on the hind wings the central green patch scarcely extends beyond the subcostal, and is further contracted by all the nervules being widely black-bordered; within the cell it gradually becomes of that lustrous blue which marks the under side, and this then gives place to the oblique edge of a triangular patch of deep velvet-black that reaches to the thorax; each of the nervures and nervules is bordered by a spot exactly corresponding to those on the under surface of the male, only, instead of being clear white, of a dingy light brown: beneath—the fore wings differ little from those of male, save that the white submarginal borderings of the nerves are much larger, especially towards the tip, where they even exceed in size those on the upper surface; hind wings exactly as in male, save that the fine blue at the base of the costal is much reduced. Head, thorax and abdomen as in male, save that the crimson of the prothorax is much suffused with black.—P. H. GOSSE; Sandhurst, Torquay, May 6, 1881.

LARVA OF *THECLA W-ALBUM*.—Is it not unusual to find a larva of the genus *Thecla* cannibalistic? My friend, Mr. Wellman, some three weeks ago kindly gave me half a dozen full-fed larvæ of *Thecla W-album*; and on my arriving home late that evening I found that five out of the six had spun themselves up previous to pupating, being then quite brown in colour. You can imagine my surprise on going the next morning to give the sixth, a green larva, some fresh elm, to find that it had half eaten, and was still apparently enjoying, one of his companions. I should be glad to hear whether any of your correspondents have met with larvæ of this genus being cannibals before.—A. BLISS; 249, Brockley Road, S.E., June 21, 1881.

DEIOPEIA PULCHELLA IN IRELAND.—It will, I think, be of interest to note the capture of a specimen of *D. pulchella*, which I took on September 7th, 1880, in the vicinity of Ardmore, on the

Waterford coast. It is, as far as I can make out, the first notice of its occurrence in Ireland. I found the moth in a field a few hundred yards from the cliff, and was ignorant till recently of its rarity. It only measures 1 inch 4 lines in the expanse of its fore wings, but there can be no doubt as to the species.—C. B. USSHER; The College, Marlborough, June 7, 1881.

ABUNDANCE OF *LITHOSIA RUBRICOLLIS*.—From June 12th up to the present date *Lithosia rubricollis* has simply swarmed in a wood near here. They were to be taken, freshly emerged from pupæ, at rest on the ferns in any numbers. They were also to be seen flying round the tops of some fir trees in “myriads.” Is not this an unusual occurrence?—J. H. LEECH; St. Paul’s Vicarage, Shanklin, Isle of Wight, June 22, 1881.

LEPIDOPTERA AT WICKEN FEN.—We understand that so far the captures of Lepidoptera during the present season have been below the average in the Wicken district. On two or three warm still nights a fair number of *Meliana flummea*, with a few *Macrogaster arundinis*, have been taken at light. *Nascia ciliialis* appears this year to be scarce; while the larvæ of *Orgyia cænosa* has not appeared.—JOHN T. CARRINGTON; June 20, 1881.

ACRONYCTA ALNI AND STAUROPUS FAGI.—On May 28th I bred a fine specimen of *Acronycta alni*, and on the 30th another equally good. From June 2nd to the 6th six *Stauropus fagi* emerged, two of which were unfortunately crippled. These were the produce of eggs which I obtained from a female taken by me on the 10th July last year. Insects appear to be unusually abundant down here this season.—E. H. JONES; Queen’s Lodge, Lyndhurst, June 23, 1881.

BREEDING RARE LEPIDOPTERA.—I have much pleasure in recording the successful breeding of three *Acronycta alni* from larvæ taken in the New Forest last autumn; also two *Limacodes asellus*, a nice series of *Notodonta chaonia*, *Cymatophora ridens*, *Diphthera Orion*, and a magnificent series of *Stauropus fagi*, the latter reared from eggs; and I may say I have been so far successful in hibernating the larvæ of *Apatura Iris*.—J. W. JOBSON; 4, Hope Villa, Capworth Street, Leyton, Essex, June, 1881.

FURTHER NOTES ON BREEDING *ACIDALIA OCHRATA*.—In the last volume of the ‘Entomologist’ (Entom. xiii. 306), I described

the larva of this very local *Acidalia*. The description was made from abnormally forced larvæ; but the remaining portion of the brood, that had been fed out of doors, hybernated when quite small. They did not move or feed all the winter, but remained attached in a slightly bent position to the dried roots and stems of grass until April, when a few warm days tempted them to move. As the forced larvæ had done well on the flowers of various *Compositæ*, I first tried to tempt them with the flowers of coltsfoot (*Tussilago farfara*). This they nibbled at times during April, and by the end of the month *Taraxacum* flowers and leaves were added to their bill of fare. During May the withered and nearly dry food was slightly wetted twice a week by means of a glass-spray producer; this gentle bath seemed to suit them admirably. The idea was suggested to my mind by knowing that in their natural habitat they would be subject to frequent fog and moisture. At any rate it succeeded well, and by the middle of June all had spun their flimsy cocoons amongst the food-plant. The hybernated larvæ did not vary or differ from the forced examples; perhaps a trifle larger. I shall in all probability have eggs for friends by the third week in July.—W. H. TUGWELL; 3, Lewisham Road, Greenwich.

DICRORAMPHA FLAVIDORSANA, (?) *Knaggs*.—Towards the end of last month, whilst working the rocks on the North Devon coast in search of the pupæ of *Sesia muscæformis*, of which by the way I only got one living pupa and plenty of old cases, I netted three examples of a species of *Dicrorampha*. I saw many others, but, from the nature of the situation, was unable to capture any more at that time. Since then I have taken a few nearly every day, and have also bred a few from pupæ found in the root-stocks of *Chrysanthemum leucanthemum* and *Matricaria inodra* var. *salina*; but only one from the last-named plant. I have not specimens of either *D. politana* or *D. alpinana* with which to compare my insects, but from their large size, dark olive-brown ground colour, and bright dorsal and apical orange markings, they seem to me to be distinct from either, and to agree with the *D. flavidorsana* of Dr. Knaggs, except in the size. Then, again, the pupæ being found in the ox-eye daisy and the other allied plant, and the burrows noticed down the stem, is strong presumptive evidence of the larva having fed in those plants; this in itself does not prove a question of species, but I consider

it an important item. I did not observe *Achillea*, and tansy certainly does not grow on or anywhere near the spot. Ox-eye grows on the top of the cliffs and in fields, but little distant therefrom, but this particular insect does not occur among the plant there. It seems confined to a particular space of rugged rock, where there is here and there just sufficient earth for a few plants of the species named to flourish, together with such others as are usually found in similar localities, as *Silene maritima*, *Statice*, &c. I noticed a female settle on the under side of a flower of ox-eye, but I could not get at that blossom to see if she had deposited eggs. The perfect insects are on the wing from 2 p.m. till 4 p.m., not continuously, but at intervals; did not observe it either before or after those hours.—RICHARD SOUTH; 12, Abbey Gardens, N.W., June 12, 1881.

COLEOPHORA INFLATELLA.—I have succeeded in breeding a nice long series of *Coleophora inflatella* from larvæ gathered on the south-east coast.—C. J. BODEN; 153, Snowfields, Southwark, June 17, 1881.

CLOSTERA ANACHORETA.—In the 'Entomologist' for 1876, vol. ix., p. 232, will be found a notice to the readers of that journal that I had discovered the pupa of *Clostera anachoreta* whilst at Deal. I beg to state, for the Rev. J. Green's information and others, that the pupa was found behind the loose bark of a pollard willow, no poplar being near.—S. NORMAN; Dartmouth Castle, South Devon.

LEPIDOPTERA ATTRACTED BY ELECTRIC LIGHT.—Whilst passing through the city on Saturday night I noticed Lepidoptera flying round the three high electric lights placed near the Mansion House at the corner of Cheapside, King William Street, and Cornhill; and also round the two lower lights, one at each end of the Royal Exchange. On one of the latter I saw three moths at the same time, and on the other there were two. Considering the little vegetation about that part of the city, I should think the moths must have been attracted from some considerable distance. It is needless to say it was impossible to detect the species.—A. W. MERA; 195, The Grove, Hammersmith, June 23, 1881.

[Last Sunday evening, June 26th, I observed moths flying round nearly all the electric lights on Waterloo Bridge. One moth which fell upon the pavement was *Arctia menthastri*, and I

have no doubt the others were of the same species. Our correspondent forgets that within the precincts of the Bank of England is sufficient vegetation to support a large number of larvæ. The Embankment gardens, no doubt, supplied those moths I saw.—J. T. C.]

SIR JOHN LUBBOCK ON THE HABITS OF ANTS.—On Thursday, 2nd June, Sir John Lubbock read a further paper on this subject at the meeting of the Linnean Society. He said that in one of his former papers (*Linnean Society Journ.*, vol. xiv. p. 278), he had given a series of experiments made on ants with light of different colours, in order, if possible, to determine whether ants had the power of distinguishing different colours. For this purpose he utilised the dread which ants when on their nest have of light. Not unnaturally, if a nest is uncovered, they think they are being attacked, and hasten to carry their young away to a darker, and as they suppose a safer, place. He satisfied himself by hundreds of experiments that if he exposed to light most of a nest, but left any part of it covered over, the young would certainly be conveyed to the dark portion. In this manner he satisfied himself that the different rays of the spectrum act on them in a different manner from that in which they affect us; for instance, that ants are specially sensitive to the violet rays. But he was anxious to go beyond this, and to attempt to determine how far their limits of vision agree with ours. We all know that if a ray of white light is passed through a prism, it is broken up into a beautiful band of colours—the spectrum. To our eyes it is bounded by red at the one end and violet at the other, the edge being sharply marked at the red end, but less abruptly at the violet. But a ray of light contains, besides the rays visible to our eyes, others which are called, though not with absolute correctness, heat rays and chemical rays. These, so far from being bounded by the limits of our vision, extend far beyond it, the heat rays at the red, the chemical rays at the violet end. He wished under these circumstances to determine, if possible, whether the limits of vision in the case of ants was the same as with us. This interesting problem he endeavoured to solve as follows:—If an ant's nest be disturbed, the ants soon carry their grubs and chrysalises underground again to a place of safety. Sir John, availing himself of this habit, placed some ants with larvæ and pupæ between two plates of glass about one-eighth of

an inch, a distance which leaves just room enough for the ants to move about freely. He found that if he covered over part of the glass with any opaque substance, the young were always carried into the part thus darkened. He then tried placing over the nest different coloured glasses, and found that if he placed side by side a pale yellow glass and one of deep violet, the young were always carried under the former, showing that though the light yellow was much more transparent to our eyes, it was, on the contrary, much less so to the ants. So far he had gone in experiments already recorded. But he now wished, as already mentioned, to go further, and test the effect upon them of the ultra-violet rays, which to us are invisible. For this purpose, among other experiments, he used a solution of sulphate of quinine and bisulphide of carbon, both of which transmit all the visible rays, and are therefore perfectly colourless and transparent to us, but which completely stop the ultra-violet rays. Over a part of one of his nests he placed flat-sided bottles containing the above-mentioned fluids, and over another part a piece of dark violet glass; in every case the larvæ were carried under the transparent liquids, and not under the violet glass. Again, he threw a spectrum into a similar nest, and found that if the ants had to choose between placing their young in the ultra-violet rays or in the red, they preferred the latter. He infers, therefore, that the ants perceive the ultra-violet rays, which to our eyes are quite invisible. Now as every ray of homogeneous light which we can perceive at all appears to us a distinct colour, it seems probable that these ultra-violet rays must make themselves apparent to the ants as a distinct and separate colour (of which we can form no idea), but as unlike the rest as red is from yellow, or green from violet. The question also arises whether white light to these insects would differ from our white light in containing this additional colour. At any rate, as few of the colours in nature are pure colours, but almost all arise from the combination of rays of different wave-lengths, and as in such cases the visible resultant would be composed not only of the rays which we see, but of these and the ultra-violet it would appear that the colours of objects and the general aspect of nature must present to them a very different appearance from what it does to us. Similar experiments which Sir John also made with some of the lower Crustacea points to the same conclusion, but the account of these

he reserved to a future occasion. He then proceeded to describe some experiments made on the sense of direction possessed by ants, but it would not be easy to make these intelligible without figures. After detailing some further experiments on the power of recognising friends, he gave some facts which appear to show that ants by selection of food can produce either a queen or a worker at will from a given egg. Lastly, he stated that he had still some ants which he had commenced to observe in 1874, and which are still living and in perfect health; they now, therefore, must be more than seven years old, being, therefore, by far the oldest insects on record.—*Communicated by the Secretary.*

DOLERUS PALUSTRIS BRED.—It is curious that until last year the life-history of the *Doleridæ* was quite unknown, although we have fifty-seven European species, many of which are amongst our very commonest sunflies. In 1880 Vollenhoven's description of the larva of *D. hamatodes*, Schk., was posthumously published (Tijd. v. Ent. xxxiii., 14—16). This feeds on *Juncus effusus*. Kaltenbach bred *D. gonager*, Fabr., from *Festuca pratensis*, but gave no life-history notes nor description of larva ('Pflanzenfeinde,' p. 746). For some years I have found a sawfly larva feeding inside the stems of *Equisetum*, which I strongly suspected to belong to a *Dolerus*; but several, not very determined, attempts at rearing the imagos had failed. Last year I collected some scores of the larvæ, and kept them in three large cages. The contents of that kept damp very soon became quite rotten and useless; in that kept dry the food-plant and larvæ very soon dried up; but the cage in which the *Equisetum* was slightly damped, through the addition of fresh stems from time to time, it became very mouldy; here I had hopes, and from this store am now breeding imagos of *Dolerus palustris*, Klg. A male and female emerged yesterday, and two males the day before. The larva is roughly described in my diary as follows:—Form as in Vollenhoven's figure (Tijd. v. Ent., vol. xxxiii., pl. 3, bottom), with six legs and sixteen claspers, including the anal pair; head dark brown, with pale oval mark on face; body wrinkled, greenish slate dorsally, glaucous ventrally; dorsal line slightly darker than general ground colour; spiracular lines greenish yellow, in which are the black inconspicuous spiracles; length, three-quarters of an inch. It feeds inside the stems of *Equisetum limosum*, not eating through the nodes, but apparently coming out at the end,

and biting into the next division, just above the joint; generally, however, there is but one hole between the joints, and this mostly at the base, so probably the larva exits at the entrance-hole. It pupates in the ground, and, as is general in the *Tenthredinidæ*, the larva enters it in the autumn but does not become a pupa until the following spring. My specimens hybernated in little earthen cells quite at the bottom of the cage, which contained about six inches of earth. A small percentage only turned to light yellowish-brown pupæ in the earthen cells. I could discover no trace of silk, or anything worthy of the name of a cocoon.—EDWARD A. FITCH; Maldon, Essex, April 27, 1881.

THE MANGOLD-FLY.—The mangold crops in this neighbourhood are again seriously threatened by the attacks of the “mangold-fly,” which, commencing its work of devastation this year upon the plants whilst much smaller than in 1880, may, I fear, result in an almost total failure of this important crop in the infested districts. Mr. E. A. Fitch, in his exhaustive economic article upon this species (*Entom.* xiv., 8, 25), says that no practical remedy can be given until more is known of its special habits. Probably since then many entomologists, thus having their attention particularly drawn to it, will have made observations of practical utility in the matter of pointing out or proving an efficient remedy. It would be a valuable contribution to our knowledge if any who are in this position could give instructions that would tend either to totally or partially alleviate the losses caused by this pest?—WM. E. BRADY; 1, Queen Street, Barnsley, June 20, 1881.

[This fly is again rampant. Many of the crop reports in the agricultural journals refer to it. The following from North Notts, in the ‘Chamber of Agriculture Journal,’ is the most explicit I have met with. “If the plague of flies in the land of Egypt was as troublesome in general as the mangel wurtzel fly is to my mangels, I can understand Pharoah entreating that they might be removed. I suppose Pharoah never had a nicer lot of mangels than I had at the end of May—side hoed, horse hoed, cut out, and singled; then came the flies. A little brown fly, somewhat like a horsefly, but not so large, laid numberless eggs on the underside of the leaves. I have counted more than 100 on a leaf—some hatched, and ten or eleven maggots may be found in a leaf devouring the substance between the upper and under

skins, the leaf then withers as if frost-bitten. On one field I spread fresh-slaked lime whilst the dew was on, beginning about four a.m., but the pests are still there. On another piece I sprinkled diluted fir tree oil, such as gardeners and nurserymen use, but that was too costly, and to-day I have dusted nine acres, plant by plant, with a mixture of fresh soot, fresh-slaked lime, and flour of sulphur; and one of the boys said between the sneezes, 'If this does not kill them I don't know what will' (W. P. J. A). This week I have seen many young plants here (Maldon) quite whitened from its attack. Mangolds generally are a very thin and late plant on our heavy land, and from the continued drought are very slow growing; these larvæ feeding on the leaf-substance may be calculated to cause material loss of crop.—E. A. F.]

ANTHOMYIA BETÆ (the Mangold-fly).—Great injury from attacks of the larvæ of the *Anthomyia betæ* is of such very recent occurrence in this country, that as yet the only point that can fairly be grasped with certainty as a remedy is any kind of treatment that will encourage a quick and healthy growth, and thus enable the plant to counterbalance by rapid formation of leafage the amount which is gnawed away by the larvæ. As far as we see at present the larvæ feed for about a month in the leaves, and then turn to pupæ, and two or possibly more broods occur during



Beet. or Mangold-fly, ♀ mag., line showing spread of wings, nat. size. Head, mag.
Pupa, nat. size and magnified. Eggs (after Farsky), mag.

the season, but the later brood is not so injurious as that of the early summer, the leaves being then larger and better fitted to bear attack. A dressing of some kind of manure which will wash down to the roots on the first shower, and thus be immediately available, is the best remedy of which we have information at present. Guano has been found serviceable, and so has the application of soot; but mineral superphosphate is the most

useful that has yet been noted. Where agricultural arrangements are such (as in some parts of the Lothians) as to allow of watering at *remunerative rate*, this is a great help in times of passing drought, both by preventing the plant flagging, and giving it the benefit of manure in the soil, or specially supplied. Whether any dressing can be applied to prevent oviposition by the fly remains to be seen (and it is much to be hoped that those who experiment will give us the benefit of their experience); but, looking at the dislike of insects to sulphur, it is probable that the application of this would be useful, whether as a dressing which may be given at the rate of 14lb. per acre mixed (a few days before use) with a bushel of fresh lime, and two bushels of road scraping, or in the form of a sprinkling of gas-lime which has been exposed to atmospheric action for six months or so, and thus become a safe as well as serviceable application. Experiment in the present season has shown this to be of great use as a means of prevention of attack of the so-called turnip "fly," and though the Coleoptera and Diptera are widely apart in their natures there is much similarity in some of the points of these two kinds of attack, and the application is worth a trial. Looking also at the great attraction of animal excreta to many of the Diptera, the observation of the bad attack of the beet fly occurring for a second time on a sewage farm is worth remarking, and further notes on any matter bearing on prevention would be of general service.—E. A. ORMEROD; Dunster Lodge, Isleworth.

AN INSECT PLAGUE.—Our Preston correspondent states, "A great plague of insects, unequalled in Lancashire for many years, is visiting the agricultural districts in the neighbourhood of Clitheroe. The insects come in dense clouds, and the houses and country literally swarm with them; they eat up the grass and almost everything green. To-day (Thursday) they have passed towards Chipping, and it is reported that a whole field has been eaten bare."—"Daily Telegraph," June 17, 1881.

[Having applied to our obliging correspondent, Mr. J. B. Hodgkinson, of Preston, for particulars about this so-called insect plague, he has favoured us with the following facts:—"In reply to your enquiry, I have to state that the caterpillars which have caused so much sensation in this district are those of *Charæa graminis*. I have personally had several opportunities of verifying the extraordinary abundance of these larvæ. One of my most

trustworthy friends tells me that last Whit-Monday he had taken shelter from rain in a quarry; and while there observed these larvæ dropping over a ledge of rock into a hole beneath. Such were the immense numbers, that the hole from which they could not extricate themselves had the appearance of a seething cauldron of living creatures. No doubt a great deal of exaggeration has gone forth through the newspapers and otherwise, but, nevertheless, the phenomenon is really very extraordinary in its character. During the last two years I have had a country house in the infected district, so that I have had many opportunities of observing the habits of *C. graminis*, had they been there in unusual numbers. I may safely say I did not see two dozen specimens during the two seasons. These came to my light, which I had placed to attract insects. I find that the usual time of flight for this species is from seven to eight o'clock in the morning, when entomologists are usually enjoying their well-earned repose, after the night's work." The late Mr. Edward Newman, in his 'History of British Moths,' at page 293, says of *Charæas graminis*:—"The caterpillar has always been notorious for the injuries it causes in grass lands. Linnæus emphatically says, 'This is the most destructive of our Swedish caterpillars, laying waste our meadows and annihilating the crop of hay.' In the years 1741 and 1778 its ravages were so great as to amount to a national calamity. . . . Some authors have asserted that it spares the species of the genus *Alopecurus*, and others those of the genus *Trifolium*, but these assertions are not published on authority sufficiently reliable." It would be an interesting addition to our knowledge of Economic Entomology if Mr. Hodgkinson and other observers would find out what plants are most affected by these larvæ. At p. 200 of vol. i. of the 'Entomological Magazine,' Mr. George Wailes, writing in 1832, says of the damage done by this species of larvæ that "some years ago (in 1824 I believe), during the spring and early summer the herbage of a large portion of the level part of Skiddaw, . . . comprising at least fifty acres . . . was observed, even from the town of Keswick, to assume a dry and parched appearance; and so marked was the line that the progress made by the larvæ down the mountain could be distinctly noted." Mr. Wailes also refers to the habits of the imagines flying about eight o'clock in the morning, giving a graphic account of the abundance of the moths.—J T. C.]

CATERPILLARS STOPPING A RAILWAY TRAIN. —“To say that a train had been stopped by caterpillars would sound like a Yankee yarn, yet such a thing (according to the ‘Rangitikei Advocate’) actually took place on the local railway a few days ago. In the neighbourhood of Turakina, New Zealand, an army of caterpillars, hundreds of thousands strong, was marching across the line, bound for a new field of oats, when the train came along. Thousands of the creeping vermin were crushed by the wheels of the engine, and suddenly the train came to a dead stop. On examination it was found that the wheels of the engine had become so greasy that they kept on revolving without advancing—they could not grip the rails. The guard and the engine-driver procured sand and strewed it on the rails, and the engine made a fresh start; but it was found that during the stoppage caterpillars in thousands had crawled all over the engine, and over all the carriages inside and out.”—‘COLONIES AND INDIA.’

NOTICE OF NEW BOOK.

A Manual of Injurious Insects. By E. A. ORMEROD, F.M.S., &c.
London: W. Swan Sonnenschein & Allen. 1881.

EVERYONE interested in agriculture or floriculture should get this work, and, once having it, will wonder how he got along without it. It gives concise descriptions, with many figures, of such insect enemies as we have in our gardens and fields, with suggestions for the best methods of prevention, and the remedies for their attacks.

We first find a short introduction to Entomology; the different orders being illustrated with a familiar type species, showing figures of imago, larvæ, pupæ, &c. The work is then divided into three parts, Part I. being on “Food Crops, and the insects that injure them;” Part II. “On Forest Trees, and the insects that injure them;” and Part III. relates to “Fruit Crops.” Lastly is a useful glossary of technical and other terms used in the book. A more extended notice will appear in another number, but, in the meantime, a more useful present will not be found for the village school library or our country cousin.

The work is popularly written, and is unencumbered with unnecessary scientific terms, and so brings the subject within the power of the least initiated.—J. T. C.

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IS *VANESSA POLYCHLOROS* THE PROTOTYPE OF *V. URTICÆ*?

A QUERY SUGGESTED BY THE ABERRANT FORM OF A SPECIMEN OF
V. Urticæ OF *Polychloros* TYPE.*

BY WILLIAM WHITE.



V. URTICÆ OF *POLYCHLOROS* TYPE.

THE caterpillar of the *Vanessa* exhibited was taken at Highgate Hill in 1879, included in the larval "web" of a community of *Urticæ*, and was reared throughout its existence with the rest of the brood entirely upon nettle (*Urtica*). During the larval stage there was nothing noticeable in its appearance to distinguish it in any way from its companions. In the chrysalis form it bore the specific characters of *Urticæ* as regards its angular projections and general contour, but the colours were somewhat richer in tone than is usual, sufficiently so to attract special notice. The imago is rather below the

* Extracted from the 'Transactions of the Epping Forest and County of Essex Naturalists' Field Club.'

average measure of *Polychloros* in expanse of wings, being about the usual size of *Urticæ* (two inches). The insect is the only individual of the brood known to have varied, even in the slightest degree. Although I did not see every member of the brood, I can vouch for at least forty or fifty specimens, which I examined carefully, and found not a trace of variation in any single case. No larvæ of any other species of *Vanessidæ* were reared contemporaneously with the brood.

I have examined the antennæ of this specimen under the microscope, and find that they present the special characters found in *Polychloros*.

From these facts I make four deductions, all of which turn upon points of interest. It is from such instances of divergence as the present that we are enabled to gain some clue respecting the affinity of species known to be closely related, and for this reason I offer the following observations:—

1. As *Polychloros* lives upon elm and other trees, and *Urticæ* upon nettle and low plants, the instance is valuable as affording further evidence of the fact that neither a particular food nor a change in diet affects in any way the colouring and markings of the perfect insect, so as to offer *per se* a means of originating “varieties.” This conclusion is valid whether the specimen under consideration be really a *Polychloros* or *Urticæ*. Many experiments upon different species of insects agree, I believe without exception, in so deciding this question.

2. On the supposition that the specimen is the product of *Polychloros* parents, it is easy to infer either that the ovum was dropped whilst the female was on the wing, or else that the young caterpillar fell from a neighbouring tree soon after emergence from the egg; in either case the accident must have occurred immediately over the *Urticæ* web. As the broods of the two species rarely appear synchronously, the conjecture is scarcely to be entertained, even if the accident were probable. On such a supposition, however, it is to be deduced that (if *Polychloros*) the society of an allied species does not affect the development of the individual, but such individuals are treated as friends. It is to be remembered, at the same time, that the larva of *Urticæ* bears a much closer resemblance to *Pyrameis Cardui* than to *Polychloros* [specimens of larvæ (preserved) were exhibited for the sake of comparison.]

3. If it happen to be a hybrid* between the two species, it offers an instance of the fact which has been proved by Darwin and others, that in the case of hybrids between closely-allied forms the progeny, instead of assuming direct intermediate characters, inherits the characters of one or other of its parents; and that in numerical proportions varying with the circumstances. As my specimen is the only known individual of the swarm the theory is rather a lame one.

4. Lastly, on the understanding that the specimen is the development of an *Urticæ* larva, we must conclude that it is a case of recurrence to a previous form, and, if so, that form was *Polychloros*; that, while *Polychloros* has not changed, the change of habitat and environment has brought about the marked variety which now constitutes a separate species in *Urticæ*. In favour of this supposition I may instance the well-known fact that *V. Urticæ*,† like *V. C-Album* and *P. Cardui*, varies occasionally in colour, markings, and size, whilst *Polychloros* is much more persistent—indeed almost invariable—in type, though irregular in point of size. The latter variability, however, is common to all classes of animals at any given period.

This persistency of type argues an antiquity beyond that of its allies, and makes it appear highly probable that *V. Polychloros* is the ancestral prototype of *V. Urticæ*.

[In connection with Mr. White's paper, it may be interesting to quote the following record of a similar experience given in the 'Entomologist,' vi. 88:—"In the spring of last year I took the larvæ of what I considered to be *V. Urticæ* feeding on nettles, and from time to time added other larvæ of *Urticæ* in the same breeding-cage kept for nettle-feeders only; to my surprise a number of the imagos resembled *Polychloros* in colour and markings, keeping the size of *Urticæ*. I submit them to you for your remarks. There was no apparent difference in the larvæ that I observed while feeding.—JAMES A. TAWELL; Earl's Colne, March 11th, 1872." The late Mr. Newman headed this note "*Polychloros* Larvæ feeding on Nettle," and described the butter-

* [The Rev. G. H. Raynor records ('Entomologist,' vi. 221) finding a specimen of *V. Urticæ* in coitu with *V. Polychloros*.—ED. TRANS.]

† Newman, in his 'British Butterflies,' gives woodcuts of four aberrations of *Urticæ*, but not one of *Polychloros*; nor does he instance any variation in the latter species.

flies as follows :—"These specimens have a wonderful similarity to *Urticæ*, which they do not at all exceed in size; still the colour is nearer to that of *Polychloros* than that of *Urticæ*; and the black spot at the anal angle of the fore wing is present, as in *Polychloros*; the white spot on the costa of *Urticæ* is absent, also as in *Polychloros*." Some of these specimens were presented to Mr. Newman, and, as we are informed by Mr. B. T. Lowne, are now in the collection of the Entomological Club.—ED.]

During the discussion which followed the paper the President, Mr. Raphael Meldola, stated that Mr. White's query was, in his opinion, very suggestive, but he was disposed to think that it was hardly based upon a sufficiently broad view of the true state of affairs with respect to the genus under consideration.

The facts are that our native "Tortoiseshells" are representatives of a genus comprising about two dozen or more species ranging throughout Europe, Asia, and North and South America; or, in other words, throughout the greater portion of the Palæarctic, Nearctic, Neotropical, and Oriental zoological regions. Now *V. Polychloros* and *V. Urticæ* are two of a group of species more or less resembling them in colour and marking, this group being linked by a large number of intermediate forms with our *C-album* or "Comma" butterfly. He had thought the matter of sufficient interest to draw up the following list of species, showing the transition in question :—

| | |
|------------------------------|-------------------------|
| <i>V. C-album</i> | Europe, N. and W. Asia. |
| <i>V. I-album</i> | Asia Minor, S. Europe. |
| <i>V. V-album</i> | Asia Minor, S. Europe. |
| <i>V. Californica</i> | California. |
| <i>V. Polychloros</i> | Europe, Asia. |
| <i>V. Xanthomelas</i> | E. Europe, N. India. |
| <i>V. Cashmirensis</i> | N. India. |
| <i>V. Urticæ</i> | Europe, W. Asia. |
| <i>V. Milberti</i> | S. America. |

These were only a few of the more striking transitional forms selected for the purpose of illustrating the argument.

In the language of evolution we should therefore say that the genus *Vanessa* was in a very complete state of phyletic preservation, *i. e.*, all the species having diverged from a common ancestor, the various steps in the process of divergence, instead of having become extinct and leaving large gaps between the species, as so

frequently happens, have been more or less preserved down to the present time. *Polychloros*, *Xanthomelas*, *Urticæ*, &c., are thus true blood-relations, and, in accordance with the laws of heredity, it is not therefore surprising, although extremely interesting, that we should find one of these species occasionally giving rise to a variety resembling an allied form. If, therefore, Mr. White means to ask whether *Polychloros* is the progenitor of *Urticæ* on the strength of his having obtained a variety of the latter resembling the former, he (the President) would be inclined to answer that the two species under consideration, with their congeneric forms, had all descended from a common ancestor, and that the variety in question was a case of reversion to this ancestral type.

In illustration of the foregoing remarks the President exhibited specimens of *Urticæ* and *Polychloros*, with the intermediate North Indian *V. Cashmirensis*, and, as a parallel case, *Pyrameis Atalanta* and *Cardui*, with the intermediate *P. Callirhoë*, likewise from N. India.

Mr. A. G. Butler, F.L.S., F.Z.S., of the Zoological Department, British Museum, has kindly furnished the Editor of the Transactions with the following valuable observations on the above:—

“I have read Mr. White’s paper carefully through, and I must say that I perfectly agree with Mr. Meldola.

“The fact that the larva of *V. Polychloros* feeds upon elm, whereas that of *V. Urticæ* feeds upon nettle, would naturally lead me to look for a mutual progenitor of these and the numerous allied species whose larvæ should feed indiscriminately upon either the tree or the weed; this we find in *V. C.-Album*; therefore it is more probable that the group to which the latter species belongs is the parent of both *V. Polychloros* and *V. Urticæ* than that the latter should be derived from the former.

“The different races, or perhaps seasonal forms, of *V. C.-Album* show considerable modifications in the outline of the wing; and an examination of foreign species shows that these modifications may readily become permanent.

“I do not admit Mr. White’s statement that food does not produce variation. I have very little doubt, if he will try the same experiment that I have done, his conviction will be seriously shaken. Some years since my friend, Mr. Herbert Gosse, reared a number of singularly dark varieties of *Odonestis potatoria*, and

the only explanation for this burst of melanism which he could suggest was, that he had been reckless as to the species of grass upon which he fed the larvæ. He subsequently sent me some larvæ, which I fed upon different grass every day, with the result that I did not rear a single typical example, all being melanic and much dwarfed. When I gave up collecting our British moths some years since I got rid of my specimens with the exception of a single pair, which are now in the general collection at the British Museum.

“Mr. White says that his *V. Urticæ* is of the usual size, but with the characters of *Polychloros*; this description would answer very well for *V. Californica*, and, considering the great general resemblance between all the species of the group, the case is not a very remarkable instance of reversion.

“In a brood of about fifty *V. Urticæ*, reared by me, there was a single very dark and small specimen which, although not like *V. Polychloros*, may have been a case of reversion to something more nearly allied to *V. C-album*; and some of the species allied to the latter are very dark indeed.

“Lastly, as about half the species in the genus have the wings far more deeply dentated and subcaudate than the other half, whilst many gradations between the extremes of these two types exist, it seems most natural to look for the progenitor in a species which exhibits variation of form in accordance with the season, so that one may account for the prevalence of one type in one climate and of the other in another; and to regard two species of the same type as descended one from the other, especially when these two co-exist throughout Europe (or nearly so), seems to me to be a supposition in the highest degree improbable.”

INTRODUCTORY PAPERS ON LEPIDOPTERA.

By W. F. KIRBY,

Assistant in the Zoological Department, British Museum.

No. XVII. NYMPHALIDÆ—NYMPHALINÆ (*continued*).

THERE are several genera allied to *Hypolimnas*, all Indian or African, which are chiefly remarkable for their resemblance to species of *Danaus* or *Acraea*. The former are Indian; and two species will serve to illustrate them. One is *Hestina assimilis*, a

black butterfly expanding about four inches, streaked with pale green as in the green *Danaï*, from which, however, it may be instantly distinguished by a row of five moderate-sized submarginal red spots on the hind wings. *Penthema Lisarda*, a rarer species from North India, expands over five inches, and is one of the largest of the Indian *Nymphalidæ*. It is black, with buff streaks towards the base, and two rows of moderate-sized spots towards the hind margins of all the wings. The Indian species resembling *Danaï* have all more distinctly dentated wings than in the genus *Danaus*, but some of the African species of the genus *Pseudacreea* so closely resemble those of the *Planema* group of *Acreea* that they can scarcely be distinguished from them except by structural characters, of which the most salient is the greater abruptness of the club of the antennæ. There are also species of *Papilio* which mimic *Danainæ*, *Acraeinæ*, or the genera allied to *Hypolimnas*; but these, of course, may be distinguished at once by their six walking legs.

The genus *Euranthe* includes a few large and handsome African species, with broad fore wings, which are short, and hardly pointed at the tips. *E. Eurinome* expands about three inches and a half, and is black, with a green spot in the cell, an irregular row of long green spots beyond, then a shorter row of smaller ones, and a submarginal row. The hind wings are green at the base, the colour being irregularly divided on the outside by the nervures; and there is a row of moderately large spots between this and the submarginal row of small ones.

Some of the East Indian genera allied to *Hypolimnas* have slightly dentated wings, with the hind wings more or less rectangular. The largest and handsomest of these belong to the genus *Parthenos*. The species expand about three or four inches; the wings are adorned with bluish or greenish markings on a black ground, which are straight towards the base, and festooned or sagittate beyond the middle; the fore wings are crossed by a transverse band of large white spots, and there are several others in the cell.

Euripus Halitherses is a smaller insect averaging from two inches and a half to three inches in expanse, common in India, and black, with longitudinal buff markings towards the base of the fore wings, and a double row of spots beyond. The hind wings are irregularly dentated, with a blunt projection in the

middle of the hind margin; the radiating buff stripes cover three-fourths of the base of the wing, and there are two rows of small bluish or greenish marginal dots, arranged in pairs. The female has longer, almost entire, wings, and resembles a small *Euplœa*, being brown, with radiating white stripes on the basal third of the fore wings, and a row of small marginal double white spots. There is a white band, divided into long spots, running from the costa of the fore wings at about two-thirds of their length.

ON THE DEVELOPMENT OF THE PUPA OF *ARCTIA CAJA*.

BY EDWARD LOVETT.

UPON visiting a batch of larvæ of *Arctia caja*, which I am rearing, I observed through the thin cocoon that one was on the point of exuviating its larval skin, which had split vertically across the head and down between the prolegs, exposing the enclosed pupa. I immediately transferred the specimen to a tube of alcohol, but not before it had quite freed itself from the larval epidermis.

At this stage of its development the pupa is almost white and very soft, and by preserving it in this way I was enabled to arrest its development at this point. The immature pupa is most remarkable, for its whole appearance corresponds to that of a newly-emerged moth, except in point of colour, or rather scale development. Instead of the usual pupal form, the head, eyes, antennæ, legs and wings are *perfectly free*, as in the case of the imago, whilst the lower portion of the pupa constitutes the body, the anal orifice of which is quite conspicuous.

Upon examination under the microscope I was unable to trace the slightest scale development, but all the limbs had a fleshy, structureless appearance, giving the general idea of a foetus. The wings, however, exhibited numerous vessels ramifying over the whole surface.

I am inclined to think, from the examination of this specimen, that upon the exuviation of the larval skin the pupa is practically developed into the moth, and that an exudation of a material, somewhat analogous to *lac*, takes place. This, on exposure, hardens into what we know as the pupal skin or pupa-case, and binds the limbs of the future moth into place. It is then that

these already formed limbs complete their development, and become clothed with scales. It will also be more easily understood how cripples occur, for if the limbs, whilst in their free state, should by any accident become slightly misplaced, contorted, or maimed, they would become cemented in that condition by the hardening over them of the exuded "lac." Therefore it is probable that the setting of the pupa-case is the most critical point in the insect's existence.

As there was no trace whatever of scales, as such it would be interesting to know how and when their development took place, and to what causes variations in their form of colour and arrangement may be attributed. It would appear probable that, "*cetera paribus*," the effect of light upon the exposed surface of the rapidly maturing wings would cause certain results as to colour.

Holly Mount, Croydon, July 2, 1881.

ENTOMOLOGICAL NOTES, CAPTURES, &c.

THECLA W-ALBUM.—As one of the founders of the South London Entomological Society, I am surprised to find the secretary not knowing that the larvæ of *Thecla W-album* are cannibals, as I have stated before that Society several times that such was the case. I have bred it for several years, but never put them together until they attain the pupæ state, otherwise I found some of them thriving remarkably well on others which were getting beautifully less.—C. J. BODEN; 153, Snowfields, Southwark, July 4, 1881.

LARVÆ OF GENUS THECLA.—As regards the larvæ of the genus *Thecla* being cannibals, I beg to say that I have noticed it this year for the first time in *T. Quercus*. I found eight larvæ on May 31st (in Hampshire) nearly full grown. A few days after, I saw one larva which was preparing to "pupate" being eaten by three others. They were well supplied with fresh oak-leaves twice a day. I did not separate them afterwards. but there was no more cannibalism.—M. S. JENKINS; Riverside, East Molesey, July 12, 1881.

APATURA IRIS var. IOLE.—I have taken this season numerous specimens of *Apatura Iris* in our county. Amongst them is a

large and beautiful example of the black variety *Iole*. This is the second that has fallen to my net, having captured another on the same ground four years since ; but that specimen was much worn, whereas the present insect is but little removed from a bred one in condition.—E. SABINE ; 17, The Villas, Erith, Kent.

APATURA IRIS.—The larva of this beautiful insect was recorded for the first time by Mr. Drury, who took it on the 26th May, 1758, whilst beating the sallows near Brentwood, Essex.—J. HUMBLE RALPH, July, 1881.

STRIDULATION IN ARCTIA CAJA.—While examining a specimen of *Arctia caja* this morning I permitted it to walk up my hand. During the act of crawling it suddenly and several times uttered a sound as loud as, and similar to that produced by, the death's-head (*Acherontia Atropos*). So remarkable was the noise that my brother, who was in the room at the time, left his work and came over to see what caused it. I have never seen any notice of stridulation in this species, and should be glad to know if any of your correspondents have made a similar observation.—EDWARD LOVETT ; Holly Mount, Croydon, S.E., July 22, 1881.

ABUNDANCE OF ORGYIA ANTIQUA IN LONDON.—Without fear of contradiction the Vapourer Moth may be said to be the commonest in town, go where you will up street, down street, or “all round the square.” For some weeks to come you will be sure to see the little brown gentleman dancing about, ziczacing in the sunshine both morning and afternoon. Although the insect is so common, I would call attention to the extraordinary number of larvæ which have appeared this season in London. Persons walking up “The Mall,” for instance, can hardly fail to have observed the condition of the lime-trees in that avenue, more especially from Buckingham Palace to Marlborough House. Some few are quite denuded of leaves, only the skeletons and midribs being left ; many have large boughs served in the same way, and looking up at these boughs defoliated by the innumerable jaws that have been at work upon them we can soon see the cocoons of this moth, not one here and there, but in regular clusters, so abundant are they. The thorns in the parks, too, have been almost as badly served. In passing along the Mall this morning I observed numbers of cocoons spun up on the bark of the plane-trees, and here and there a female had covered them with her eggs ; while

many were crawling about the stems of the trees.—V. R. PERKINS; 54, Gloucester Street, Pimlico, S.W., July 20, 1881.

BOLETOBIA FULIGINARIA IN LONDON.—I am pleased to inform you that I have been fortunate in having another specimen of *Boletobia fuliginaria*, handed to me by the same man who took the one I recorded in 1879. This was taken on our warehouse door, in Upper Thames Street, when opened this morning. It is a male, and in good condition.—J. R. WELLMAN; Elm Park, Brixton Rise, S.W., July 14, 1881.

ABUNDANCE OF HYBERNIA DEFOLIARIA AND OTHER LARVÆ IN THE NEW FOREST.—Having visited the New Forest about the middle of June I was very much surprised to find the oak trees, in this proverbially leafy month, as bare and leafless as in “dark December.” The contrast between the bright beautiful green of the ferns and the grey dead appearance of the oaks was very striking; it was the difference between life and death: in fact I heard an old man say, “All the oaks in the forest are dead.” Such a phenomenon is, I believe, happily rare in this country; at all events the oldest inhabitant of the locality I visited (Holmsley) does not remember any similar occurrence. Having examined the trees I found that myriads of *H. defoliaria* and other larvæ, having denuded them of every particle of foliage, were hanging from the leafless branches by silken threads, or ravenously consuming the brambles and other green herbage on the ground. The incessant rasping noise of countless thousands of jaws was distinctly and strangely audible. I do not know whether this phenomenon was local, or extended over the whole of the forest. Perhaps some other correspondent may favour us with his experience. Insects generally are abundant this season in the forest; but *Triphæna pronuba*, in numbers as well as variety, surpasses all other species. I would strongly recommend collectors to take a good series of this common, but beautiful, moth, as several varieties can now be obtained which are rarely seen in ordinary seasons.—W. M'RAE; Westbourne House, Bournemouth, July 20, 1881.

ON THE REARING OF LEUCANIA OBSOLETA FROM THE LARVA.—At the latter end of August, 1880, whilst on an entomological visit to Buckinghamshire, at the end of a day's run I took home a number of the stems of *Arundo phragmites*. They were placed

upon a table in my room that night, and I was agreeably surprised at finding that my reeds were tenanted by some beautiful larvæ, of which the following description was taken some weeks later on:—Larvæ two inches in length, stout in proportion; the head is globular and projected in crawling; the body is cylindrical, the skin smooth and glossy; after retiring to its winter rest becomes wrinkled and puckered; the body is yellowish gray, beautifully tinged with a rosy hue which is very perceptible in the interstices of the segments where the skin is folded; the dorsal line white, bordered with dark green; subdorsal line slender and whitish; a pale line along the spiracles, which are black, with a grey centre. The head brown, with darker markings down the face. These larvæ fed only by night on the leaves of the reed, retiring during the day in the hollow stem of the same. This was during the months of August and September. At the beginning of October the larvæ finally settled down *within the reeds*, spinning some silken threads to keep themselves secure. Soon after retirement the colour of the skin began to fade, till it finally became of a pale dingy yellow; it remained in this condition till the following May. The larva, if disturbed during this period, is very lively, crawling quickly out of sight if shaken from its resting-place. I observed little diminution in the size of the larva during its long abstinence. In the middle of May they changed to pupæ of a chestnut-brown colour, and the moth appeared about four weeks later on. The last came out on the 11th of July (present month).—J. HUMBLE ROLFE; July, 1881.

EXTRAORDINARY ABUNDANCE OF *TRIPHÆNA PRONUBA*.—During a short visit in the Isle of Wight, at the end of last month, I observed *Triphæna pronuba* everywhere I went in the most extraordinary abundance. In Daishe's Hotel, Shanklin, they were swept from the hall and passages each morning by scores, where they had been attracted by light. As the train passed through the country they rose in numbers from the herbage by the railway side. While walking from Ventnor to Sandrock Hotel, by the cliffs, they were flying in abundance during the hot sunshine.—JOHN T. CARRINGTON; Royal Aquarium, July, 1881.

LEPIDOPTERA AT LYNDBURST.—At the end of last month I went to Lyndhurst for a week's collecting. At sugar there was not a great variety of insects, but those that did occur were

plentiful. *Leucania turca* was in great numbers, there were constantly three or four on a tree. *Diphthera orion* was also very abundant on some nights; at times I could have taken twenty or thirty in an evening. *Aplecta herbida* were also plentiful, mostly in good condition. *Boarmia roboraria* and *B. consortaria* generally put in an appearance about 10.30 p.m.; they were both to be taken plentifully in the daytime on trunks of trees. I also obtained at sugar one *B. repandata* var. *conversaria*. *Thyatira batis*, *Noctua brunnea*, *Xylophasia hepatica*, and other common insects, were abundant. In the daytime I took several males of *Euthemonia russula*, also a couple of females; a few *Macroglossa fuciformis* at the rhododendrons; *Lithosia rubricollis* were extremely plentiful. I also took *Arctia fuliginosa*, *Acidalia strigillaria*, *Anarta myrtili*, *Phorodesma bajularia* (at dusk), *Calligenia miniata*, &c. Among the butterflies *Argynnis Paphia*, *A. Adippe* and *Limenitis Sibylla* were all extremely plentiful and in perfect condition. On the 2nd inst. I had the good fortune to capture an extraordinary variety of *L. Sibylla*, nearly approaching the black variety; I took one *Leucophasia sinapis*, and saw two *Pieris crataegi* taken, but both were much worn.—N. C. GRAHAM; Silwood, Tulse Hill, S.W., July 19, 1881.

LEPIDOPTERA ON THORNE MOOR.—On a recent visit to Thorne Moor, in Yorkshire, I captured, amongst a number of other species, *Acidalia circellata*, *Hyria auroraria*, *Crambus Warringtonellus*, *C. margaritellus*, and *Phycis carbonariella*. *Chortobius Davus* was abundant, but I was informed by a friend who lives in the locality that *C. Pamphilus* has never been taken on the heath proper, although it has occurred in the lanes and fields in the neighbourhood.—W. PREST; 13, Holgate Road, Yorks.

LEPIDOPTERA IN JUNE.—*Stauropus fagi* has been taken not uncommonly in Epping Forest this season; specimens have also occurred at West Wickham, where *Notodonta carmelita* was again found. The larvæ of *Thecla betulæ* were very common at Epping, as were also those of *Anthocharis cardamines*. At Chingford *Angerona prunaria* was abundant. *Lithosia aureola* not uncommon, neither was *Eurymene dolabraria*. The oaks in Epping Forest and neighbourhood have been rendered quite leafless by the larvæ of *Tortrix viridana*.—THOMAS EEDLE; 40, Goldsmith Row, Hackney Road, London, E.

LEPIDOPTERA IN NORTH DEVON.—I am very busy at sugar just now. The common moths about here have not often been invited to such repasts as I have given them. They are the most greedy set of gourmands I ever met with. *Aplecta herbida* is to be had freely, as is also *Apamea gemina*, with *Thyatira batis* and *T. derasa*. The banded form of *Boarmia repandata* turns up now and then. I take with the net *Botys terrealis*, *Pterophorus tephrodactylus*, and *P. Zetterstedtii*. Also two or three *Eupœcilia curvistrigana*.—R. SOUTH; July 2, 1881.

LEPIDOPTERA AT PLYMOUTH.—We have not yet recovered the wet seasons of the past two years with regard to Lepidoptera; one can walk miles in the woods around Plymouth and not see a single leaf eaten. I went out on Thursday and did two hours' beating for larvæ, and obtained two *Amphydasis betularia*. The imagos of Lepidoptera are just as scarce.—G. C. BIGNELL; 7, Clarence Place, Stonehouse, Plymouth, July 25, 1881.

LEPIDOPTERA IN LONDON.—On several warm evenings in June I have seen moths flying round the electric lights in the city. One of them I caught at rest on the wall of St. Mary Woolnoth Church, at the corner of Lombard Street; it was *Arctia menthastri*: this one probably came from the enclosure in the Bank of England. I have occasionally, too, seen the males of *Orgyia antiqua* flying in broad daylight in the Strand.—C. E. M. INCE; 29, Stephen's Avenue, Shepherd's Bush, W., July 4, 1881.

INSECTS ATTRACTED BY ELECTRIC LIGHT.—I have another note to add about moths and the electric light. Yesterday, while walking over London Bridge, I saw some workmen who had just been cleaning out or repairing one of the electric lamps. One of the men had a large moth in his hand, which was a small and slightly damaged specimen of *Cossus ligniperda*. The workman said that he "found a plenty of them sort up there"; meaning round the lamps.—C. E. M. INCE; July 6, 1881.

NOTES ON THE SEASON. — Although we certainly cannot complain this summer of any deficiency of sunshine, and the heat has at times been almost tropical, insect-life has been by no means so prolific, at least in this district, as we might have expected. In the spring the garden whites, *Pieris brassicæ* and *P. rapæ*, were more than usually numerous in the perfect state. I did not notice a corresponding amount of larvæ, and the

cabbages have been peculiarly free from their attacks. *Limenitis Sibylla* in one small wood appeared in some numbers in the last week of June, when they were just fresh from the chrysalis. I bred several specimens of this species from larvæ collected in the New Forest, and cannot help remarking upon the difference in the intensity of colour between these and the Chichester insects. Contrary to what one would have thought, the bred Forest examples are not nearly so black, though larger. Several larvæ of *Apatura Iris* were found by Mr. C. Gulliver on willow (*Salix caprea*) in the New Forest in the spring. I myself bred eight imagines, but only four really fine. These were males; the one female that emerged was unfortunately slightly deformed, the right upper and under wings being a trifle smaller than the left pair. It may have been noticed often before, but I was struck with a peculiar habit of this butterfly upon its emergence from the pupa. In every case that I observed it was the practice of the insects to remain for several hours clinging to the pupa-case, with the head upwards and the wings hanging downwards. They then reversed the position, and, still clasping the pupa-case, continued motionless, with the head down and body up, for another three or four hours; after which, if allowed to live, they dashed wildly about the breeding-cage till they settled down comfortably to sleep about six o'clock in the evening. When thus locked in the arms of Somnus, I judged the most fitting opportunity for killing them, a small drop or two of chloroform quickly putting them into a state of insensibility. I fed one with honey from a *Gloxinia*, which it sucked up with evident satisfaction, and another seemed to enjoy the perspiration from my hand. Hitherto there have been only few of the common *Vanessas*, such as *V. Io*, *V. Atalanta*, and *V. cardui*; but hibernated *V. urticae* have been exceptionally abundant. The moth of the season is certainly *Tryphæna pronuba*, which has appeared in profusion. Every flower in the garden teems with them, and they are a perfect pest at sugar. *Plusia gamma*, strange to say, is just as scarce. Sugar has attracted little besides common species as yet, as *Mania maura*, *Orthosia ypsilon*, &c. Of Geometers I have found very few, but the rare little *Eupithecia irriguata* turned up in some numbers in the New Forest. The larvæ of *Arctia caja* were numerous in May. I collected a quantity of them in hope of a variety. None emerged sufficiently distinct to be of any

value, though there was much dissimilarity in the ground colour of the hind wings, the red in some cases being faint, with a tendency to yellow, especially round the steel-blue spots.—JOSEPH ANDERSON, JUN.; Chichester.

NOTES ON THE SEASON.—I cannot give any satisfactory information as to the abundance of Lepidoptera this season, not being able to go out collecting. In my garden I have seen a good many Noctuæ in the evening lately, *Tryphæna pronuba* being particularly abundant. I hear from various correspondents that common Noctuæ are plentiful. The Tortrices that infest roses are far too plentiful this season.—FREDERICK BOND; Staines, July 20, 1881.

COLLECTING IN THE HEBRIDES.—My collector has so far found this season most unsatisfactory in the Hebrides, chiefly owing to the excessive rain, which has now lasted for many weeks and left the bogs in a most uncomfortable state for work. His best capture has been some exceedingly fine stone-coloured varieties of *Boarmia repandata*: some of these are very light in colour and beautiful in appearance. They differ in a very marked manner from any other variety I have seen of this species. Interesting forms of *Cidaria russata* have appeared, from which I have a number of ova. It will be interesting to see if these types are perpetuated when the insect passes through all its stages in our very different and much dryer climate. *Camptogramma bilineata* is variable from the western isles; dark forms predominating, some being nearly black. *Chortobius Davus* is small, much smaller than Rannoch specimens. *Melanippe hastata* is very rich in colour, the dark markings being exceptionally black and showing well in contrast with the pure white ground of the wings.—E. G. MEEK; 56, Brompton Road, S.W., July 22, 1881.

ESHER WOODS.—To those entomologists residing in London who have but little time for pursuing the science, the opening up of new localities in the neighbourhood of the metropolis is a great desideratum. Claygate covers and the Esher pine-woods are within an hour's walk from Surbiton Station, half an hour's run from Waterloo; yet they are not worked as they deserve to be. On July 2nd I saw *Argynnis Paphia* out already, and *A. Adippe* will probably soon follow. Sugaring the same evening, I took a dozen of *Leucania turca*, some *Aplecta herbida*, *Acronycta ligustri*,

many *Xylophasia hepatica*, *Thyatira batis*, *T. derasa*, and one or two *Heliothis marginata*, &c. *Phorodesma bajularia* was flying in numbers, a dozen falling easily to my net; and *Tephrosia consortaria* was resting on a sugared tree, whether attracted by the sweets or not I do not know. *Erastria fuscula*, which is very abundant in the pine-woods, was nearly over, but I took three or four. A worn male *Euthemonia russula* turned up, and *Anarta myrtilli* was very abundant on the heath. — H. K. HARRIS; 2, Richmond Villas, London Road, Kingston-on-Thames.

SUGARING AT DARENTH.—Whilst sugaring in Darenth Wood on Saturday (10th July) I had the good fortune to capture, amongst many commoner insects, two *Acronycta leporina*, *Hadena contigua*, *Aplecta tineta*, and a very fine specimen of *Orthosia suspecta*. Is not the occurrence of the last-named species in the South of England rather unusual?—J. A. FINZI; 105, Gower Street, W.C., July 11, 1881.

AN AFTERNOON IN WICKEN FEN.—I am glad to be able to put on record one of the most successful afternoons as regards collecting I ever made. On June 26th I strolled into the fen about three o'clock, and shortly saw such a sight as would have made glad the heart of the most morose entomologist. In less than two hours I boxed nearly two hundred specimens of really good insects. *Phoxopteryx palludana* was common, as was also *Eupæcilia notulana*, the latter very fine both in condition and size. The extremely rare and beautiful *Cosmopteryx orichalcella* was flitting over the fescue grass (*Festuca*): of this I got a nice series. *C. Licnigiella* was also taken. *Bucculatrix frangulella* was abundant round bushes of buckthorn (*Rhamnus catharticus*). I got a single specimen of what must be *Eupæcilia Geyeriana*, but from the fact of its being a month earlier than the Norfolk specimens, and being so much smaller and brighter in colour, made me at first think I had got an addition to our list. Since then I have, however, obtained a longer series, and find they vary to a considerable extent, some specimens being almost counterparts of *E. vectisana*. *Penthina carbonana* was not uncommon. *Anesychia funerella* was abundant amongst the comfrey (*Symphytum officinale*). *Chauliodus illigerella* was flying at dusk with *Coleophora anatipennella*, as also was *C. troglodytella*. *Gelechia inornatella* was scarce, with *G. rufescentella*, and five specimens of

G. lathyri fell to my net. *Lobophora sexalata* was frequent. *Herminia cribralis* and *Parapornyx strateolatis* were in great abundance. When I had a short interval of rest from using the net I found larvæ of *Gelechia morosa*, from which I have since reared several specimens. Larvæ of *Peronia hastiana* were common, and from amongst them *Phoxopteryx subarcuana* have appeared. I think, from the very incomplete sketch I have given your readers, they will agree with me "that such an afternoon" rarely falls to the lot of the entomologist.—E. G. MEEK; 56, Brompton Road, S.W., July 22, 1881.

GELECHIA CEREALELLA.—Two years ago a friend gave me two cobs of a small sort of Indian corn or Maize, telling me that larvæ of some kind were in them. Last year some moths came out while I was from home, and were quite spoiled before I returned. About a month ago I saw in my room two or three small moths, and on looking at them I saw they were not, as I first supposed, *Tinea biselliella*; I then recollected my cobs, and on looking at them saw some moths in the box and found they were *G. cerealella*, a species I had not seen or heard of for more than twenty-five years. I have set a good many specimens.—FREDERICK BOND; Staines, July, 1881.

GRACILIA PYGMÆA.—This little longicorn is said to occur "not unfrequently in old wood-work, twigs, &c." It has never been my lot to meet with it in any number before this present time. I have only come across single individuals, and those I may say by mere chance. Last year I only met with one, and that in my own house; and this year it turned up again. While I was sitting talking to a friend who called on Monday afternoon, I saw one running about, but failed to secure it, as it fell from my wetted finger before I could put it into my bottle; and, though we both searched well after it, we could not find it again. The next morning, while reading a newspaper after breakfast, I found another crawling up my sleeve; this one I lost exactly in the same manner; it fell apparently to the carpet, but even three pairs of eyes could not detect its whereabouts. Thinking there must be more about, I searched everywhere I could think of, but without success. However, on Wednesday I came upon its habitat; a few days before, I received from Wotton-under-Edge a small hamper of fruit for preserving, and, as the hamper was to

be returned, it was put into my store-room to be ready for sending back, and as I was going to put some things into it I of course had to move it, and struck it on to the floor with a smart jar; when lo! and behold! the ground seemed all alive in a minute with these little beetles; but to secure them was no easy matter, they were so uncommonly active. I managed, however, to get some two or three dozen into a wide-mouthed bottle that was at hand, while many escaped, probably to turn up again. Though they were not left very long in the bottle, they seem to have made use of their time in disfiguring one another, as many had their antennæ shortened and their tarsi mutilated. How many had been shaken out of the hamper on its Midland journey *viâ* Birmingham and Bedford it is impossible to say, but evidently there were plenty left in it.—V. R. PERKINS; 54, Gloucester Street, Pimlico, S.W., July 23, 1881.

PHÆDON BETULÆ (Sharp, Cat.).—Can you, or any reader of the ‘Entomologist,’ tell me what is the food-plant of *Phædon betulæ*? In the few instances that I have met with it “at home” it has invariably been on the water starwort, *Callitriche verna*.—THOMAS H. HART; Kingsnorth, Ashford, Kent, June 22, 1881.

[There is great confusion existing in the nomenclature of our four species of *Phædon*, especially in those species badly named in relation to some special food-plant. *Phædon betulæ* is, I believe, generally abundant in watery places, feeding specially on the various *Cruciferae* living in such situations, its larva also riddling their leaves; it is particularly partial to watercress. Of late years I have received many specimens as being a serious pest to our mustard crops, especially in the eastern counties, but have it also from Ireland (see Curtis’ Farm. Ins., p. 103; Inj. Ins. Report, 1877, p. 19, 1879, p. 35; and Entom. xiv. 44). Kaltenbach summarises the continental knowledge thus:—“*P. betulæ*, L. (= *P. cochleariæ*, Fb.), may be found, according to Gyllenhall and my own observation, on *Veronica beccabunga*; more commonly I have beaten this species in the spring from *Cardamine amara*, growing in wet places in woods. I have frequently found its larva with those of *Helodes beccabunga*, Hellw., feeding on the underside of the leaves of the ‘Quellen-Ehrenpreis’ (*V. beccabunga*). It undergoes its metamorphosis in the earth; the pupa state only lasting fourteen days. Herr Cornelius observed two generations; the spring

brood of the larvæ he found in May and June, and the second generation in September (Stett. Ent. Zeit., 1863, p. 123). In 1861 this beetle committed great ravages on the blooms of the 'Meerrettigs' (*Cochlearia Armoracia*) at Molin, in Bohemia, so that there was quite a failure in the production of the far-famed 'Moliner Krenes,' the cultivation of which supports many hundreds of families." Differing from this synonymy Dr. Sharp makes *P. betulæ*, L., = *armoracæ*, L., of Wat. Cat., and *P. cochleariæ*, Fb., = *betulæ* of Wat. Cat., but not Linné. Dr. Power writes: "*P. betulæ* of Sharp is larger than *P. betulæ* of Waterhouse, and may at once be known by the callosities on its shoulders. It is less common than the smaller species. They are, however, both very abundant in wet places, affecting, I believe, *any* of the *Cruciferae*; I do not believe they are very particular which; certainly they abound on the watercress, but I suspect that the little one is more omnivorous and less aquatic than the other species with callosities. I have recently seen it utterly destroying a crop of horseradish, &c., in a garden at Cowley."—E. A. F.]

CLADIUS VIMINALIS LARVÆ DESTRUCTIVE TO NUT-STUBS.—In the early part of this month a friend at Burnham, in this county, complained that the leaves of his nut-stubs were completely skeletonised by some greenish S-shaped caterpillars with black spots, which were in the greatest abundance, thus giving the stubs a very bare appearance; and that the promise of an abundant crop was quite spoiled, as the young nuts had nearly all fallen off the trees. By request some hundreds of these larvæ were sent me, and I was surprised to find them the larvæ of the common poplar and willow-feeding *Cladius viminalis*, Fallen. I find no notice of hazel as a food-plant of this sawfly larva, and, curiously, both poplar and willow are quite uncommon in the locality where this species has this year become destructively abundant. Last week I saw the devastated trees, and the leaves are quite gone; but some considerable quantity of young nuts and leaf-veins could still have been gathered up from under the trees.—EDWARD A. FITCH; Maldon, Essex, July, 1881.

ODYNERUS PICTUS; CONTRIBUTION TOWARDS ITS LIFE-HISTORY.—On the 20th June I was in the Plymouth cemetery, and on passing a monument erected to the memory of the officers and

men belonging to H.M. steam sloop 'Vixen,' about six feet from the ground I saw what appeared to me to be a handful of mud thrown at it, and lodging on the upper portion of a raised anchor which surmounts the inscription. Upon removing a small portion it disclosed a tomb containing eleven full-grown living larvæ of a *Sciaphila* (very probably *S. perterana*); the wretch who has entombed these, thought I, evidently did not believe in cremation. They had been stung without doubt, which had produced paralysis; at the bottom of the tomb was the small yellow larva of *Odynerus pictus*. I opened two, each contained the same. I brought home the larvæ, and forwarded two to Mr. Barrett for identification. I again visited the spot on the 24th, when I captured the lady, who had in the meantime re-plastered the cells I had broken, and had completely provisioned and sealed up two others; these two I opened on July 13th, and found the larvæ of *O. pictus* full fed, and the larva in the cell completed on the 24th about to commence its silken cocoon; I removed it into a glass tube, in which it completed its winter domicile in about four days. From these observations it will be perceived that the larva of the future wasp is full-fed in eighteen days from the completion of the cell; these cells were placed on the south side and exposed to the full rays of the mid-day sun. The larvæ of the *Sciaphila* that I removed on my first visit were only able to turn round from first to last, having lost all power of locomotion or contraction of the body: they remained in this state about sixteen days, when they began to dry up, although they were kept in a glass tube.—G. C. BIGNELL; Stonehouse, July 18, 1881.

QUEEN HORNET AT WORK.—On June 24th, whilst working in my potting shed, I became aware of a powerful buzz overhead, and looking up I saw a monster hornet making its way to an egg-shaped globe, about the size of a lemon, suspended from the roof. It was a thin shell of mortar, with a hole at the bottom sufficiently large to enable me to see the hornet at work inside; and I think it will be as surprising to others as it was to me to know that, although when I first observed her the shell was perfectly empty, by the morning of the 28th—less than five days—she had constructed twenty-six cells: two were empty, seventeen contained eggs, five had good-sized larvæ, and the remaining two were already sealed up for the pupa stage. At this juncture I deemed it prudent to secure the entire "ménage," mother and all, which

I accomplished, with only slight damage to the nest, by means of a large cyanide bottle.—R. S. STANDEN; Alby Hill House, Norfolk.

THE LATE MR. BLACKWALL.—A few years ago I received a letter from this veteran of science, in which he told me of the place and date of his birth. As these differ from those supplied in your interesting obituary notice, it may be well to put them on record. He said that his birth took place at his father's house in St. Ann's Square, Manchester, on January 20th, 1790. His father, Thomas Blackwall, was a draper, and afterwards an importer of Irish linen. He lived, as was the custom of the period, at his place of business; and it was not, I believe, until later that he went to reside at Crumpsall Old Hall. John Blackwall was for some years in partnership with his father; but in 1833 he retired from commercial pursuits, and fixed his abode in the vale of Conway. It may be useful to some of your readers to point out that the 'Catalogue of Scientific Papers,' published by the Royal Society, contains a list of sixty-four papers, written by the deceased gentleman.—CHARLES W. SUTTON; Manchester Public Free Libraries, Manchester, July, 1881.

[In the obituary notice of the late John Blackwall, F.L.S., at p. 147, line 20 from top, for "1847" read "1874."—O. P. C.]

ERRATUM.—Entom. p. 163, line 15, for "sunflies" read "sawflies."

REVIEWS.

Second Report of the United States Entomological Commission on the Rocky Mountain Locust. Washington: Government Printing Office. 1880.

THIS second report contains the result of the labours of Messrs. Riley, Packard, and Thomas, with their assistants, during the years 1878 and 1879. The first report (1877) treated largely of the natural history of *Caloptenus spretus* and its allies, and was practically exhaustive on the destruction of the young insects in their trans-Mississippi breeding-grounds. This second report directs attention to the prevention of injury from the disastrous winged swarms arriving in the cultivated states from the northwest. Mr. Thomas enters most fully into the facts concerning the laws governing the migration of locusts in all countries, and arrives at some very interesting conclusions, after thoroughly examining, and giving a brief summary of, the extant literature

of the subject, from Pausanias, Livy, Pliny, &c., to the present time. In some few instances he tells us a species may be migratory in one district, and in another may be truly sedentary, *e.g.*, *Acridium Americanum* and possibly *Pachytylus cinerascens*. Mr. Thomas also assures us that there are but two European species of true migratory locusts (*Pachytylus migratorius* and *Caloptenus italicus*).

The following important result is eventually arrived at:—“ Our conclusion, therefore, is that the migratory habit or instinct of locusts, whether in the Eastern or Western Continent, is directly attributable to the arid condition of the area in which they originate; that the unusually dry and rarefied state of the atmosphere is the chief factor in originating this instinct; that while it affects, to a greater or less extent, all parts of the insect, its chief influence is produced by its effect on the tracheæ and air-sacs. It also must have a tendency to harden the integuments, and to shrink or lessen the size of the softer parts. As a very general rule, more species of the *Ædipoid* groups are found in barren areas than of the *Acrididæ*; the *Acrididæ*, on the other hand, are generally fleshier, or, to use a botanical term, more succulent than the *Ædipodæ*; it follows, therefore, that the effect of unusual dryness would manifest itself much sooner in the *Acridians* than in the *Ædipodeans*, and such is undoubtedly the fact.” Then follows an examination of the varying effect of the dry years 1874—6 on the “trim” *Caloptenus bivitatus*, the “more lubberly” *C. differentialis*, and the “wild, ferocious-looking” *C. spretus*. The fallacy of the periodicity theory of migratory flights is well shown, although in both Continents there appears to be a tendency to their occurrence about every eleven years.

The report is full of valuable meteorological and agricultural data bearing on the various phases of the locust question. It contains some very exhaustive chapters on the anatomy and histology of the Orthoptera, by Mr. Packard and Mr. Minot, admirably illustrated with fifteen plates and several woodcuts. Mr. Riley contributes further facts on the natural enemies of the locusts; the interesting, and previously but slightly known, economy of the *Bombyliidæ* being illustrated with a coloured plate. Mr. Scudder contributes a list of the Orthoptera collected by Dr. Packard in the Western States, twenty of the new species described being figured. This volume also contains a large

coloured map in six sheets and three plain maps, illustrating the breeding-grounds, and showing the course of the migrations of the grasshoppers and the natural characteristics of the regions.

Altogether, these two reports on the destructive American grasshoppers are one of the best exponents of how much is to be learned about a single insect or group of insects. They can but be very beneficially studied by all entomologists; their practical value must be immense; the labours of the commission were arduous, but the results arrived at are quite beyond expectation. The United States Government generally and the members of the commission specially, deserve to be congratulated on their success.—E. A. F.

Transactions of the Epping Forest and County of Essex Naturalists' Field Club. Vol. II., Part IV. June, 1881.

THE Committee and Secretary of this energetic young Society are to be congratulated upon this series of Transactions. The number before us contains several articles which will be found interesting to our readers. The first we reprint in this number of the 'Entomologist.' Another is that by Mr. Raphael Meldola upon "The Developmental Characters of the Larvæ of the Noctuæ as determining the position of that Group." This paper is well worth our reader's perusal, whether he may fully agree with the whole of the theories advanced or not. Mr. English gives an interesting account of "The First Night's 'Sugaring' in England," which he further terms a "Reminiscence of Epping Forest in 1843." In this paper Mr. English claims to be the discoverer of that mode of attracting moths now so universally adopted by lepidopterists. The geological and anthropological sections are illustrated by engraved plates.—J. T. C.

The Butterflies of Europe. Illustrated and described by HENRY CHARLES LANG, M.D., F.L.S. Part I. Four coloured Plates, 16 pp. super-royal 8vo. London: L. Reeve & Co., 5, Henrietta Street. 1881.

WE have already noticed that this valuable work was in the press, and it is now our pleasure to see the first part, which fully confirms our expectations. The introduction is explicit, the letterpress clear, and the plates are excellent. The circulation is sure to be large.—J. T. C.

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NOTES ON AN ABNORMAL PUPA OF *BOMBYX MORI*.

BY E. KAY-ROBINSON.



ABNORMAL PUPA OF *BOMBYX MORI*.

THE above figure represents an extraordinary monstrosity of *Bombyx mori*, the silkworm of commerce, which partially emerged from the pupa state on July 14th. It consists of two specimens, perfectly separate as far as can be seen, one male and one female, contained in a single pupa. This in itself seems hardly credible, but the marvel is heightened by the fact that they are the production of a caterpillar of the usual size and appearance, that they are situated upside down, that is to say both their heads, if they have one each, are still firmly fixed where the abdomen of the imago ordinarily is. The pupa-case presented the usual outlines of wings and limbs, and yet these outlines did not correspond to the actual limbs of either of the inmates, but were simply traced as useless decorations upon that part of the pupa which contained the two abdomens.

The larva, among a small family of six, seemed in no way remarkable, and the pupa was certainly of the ordinary size and

shape. In fact there was nothing noticeable about any of my six silkworms in their immature stages, except that they appeared to get very ill when I fed them on lettuce, and were one and all rather stingy in the matter of silk. Five emerged in the way in which a proper-minded silkworm should, but the sixth, to my astonishment, seemed to have so far forgotten itself as to endeavour to come out tail first from the pupa. My surprise was increased by observing later on that there was evidently another imago of a different sex in the same pupa, equally anxious and equally unable to distinguish itself by emerging upside down. From July 14th to 20th they solemnly waved their abdomens in the air without cessation, and then the female tail settled down to the business of life, and laid five eggs, apparently expiring on the 22nd of July. Roused, however, by a stern sense of duty, she revived on July 24th, and laid another egg; then I think she really died. The male is still—July 26th—alive, though not active; he seems resigned to his fate of partial imprisonment for the rest of his mortal life.

On the old theory that the different integuments of the larva and pupa were simply so many coverings of the imago, which were peeled off in turn like the skins of an onion, such an abortion would be absolutely impossible; and even our modern knowledge that certain transformations occur in the internal organs of the insect to accompany each change of outward appearance, does not help us much to conceive the possibility of such an aberration. Between the last stage of the larva and the production of the imagines in the specimen in question, one of two startling operations must have been formed: either each organ must have divided into two, and a double set of sexual organs have developed themselves, and then the whole contents of the pupa must have violently turned round in the shell, so that the two heads and the two tails changed place; or else the head of the larva must have been developed into two sets of anal appendages, male and female, the true legs of the larva having been withdrawn. The abdominal segments of the larva have become the thoracic divisions of two imagines with legs, wings, &c., developed in addition, and the anal segments grown into two heads with all their marvellous arrangements of palpi, antennæ, &c.; and further, the liquid which the imagines excreted on emerging must have been lodged in what was the head of the caterpillar. The turning round of the imagines in the pupa-case

seems impossible for lack of space, and therefore the second hypothesis must be adopted. The changes implied in it are so enormous as to stagger belief, were it not that the specimens are still, and will probably remain, *in statu quo* to prove the matter. It really seems almost parallel with the case of a man retiring to his room for the purpose of undressing, and then discovering that his clothes contained two persons,—a man with his head in one boot, and a woman with her head in the other, and all their feet in his hat!

Datchet, Bucks, July 26, 1881.

[As Mr. Kay-Robinson suggests, "The changes implied are so enormous as to stagger belief." I have examined the subject carefully, and find the insects just as described and figured; but as to how they came to be in such an extraordinary position is past my comprehension.—J. T. C.]

A LIFE-HISTORY OF *APATURA IRIS*.

BY ALBERT BRYDGES FARN.

ON 19th July, 1880, I caught in one of the Sussex woods a female of *Apatura Iris*, and on the following day obtained two others. I placed these three females in a box with a spray of the broad-leaved sallow and some crushed fruit. They remained in this box until my return home, and were during this time quiescent and had laid no eggs. On July 22nd I covered a sallow bush with a huge bag of leno, and into it put the three females. While they were in the leno bag on the sallow bush, I fed them by crushing raspberries against the gauze, the juice of which they sucked up with avidity. I first observed that they had deposited eggs on July 25th, and do not think these eggs could have hitherto escaped my notice, as I looked most carefully two or three times daily. The eggs were laid on the upper side of the leaves, and I noticed as many as six eggs on one leaf and five eggs on another. Under perfectly natural conditions I believe—having frequently watched the females of *A. Iris* ovipositing—that no more than one egg is laid on a leaf. The eggs are semi-spherical and when first laid of a green colour, similar to those of *Smerinthus populi*. I watched these eggs from day to day until I left home for ten days, and no alteration of colour had up to that

time taken place. Upon my return home I at once went to see if these eggs had hatched, but I could find none from which a larva had emerged; they had, however, become almost black, and in some I could see that there was evidently a larva in the interior.

On August 11th the larvæ commenced to emerge, and soon after this had occurred some of them commenced to eat up the egg-shell. When first emerged the larva is about two inches in length, of a sap-green colour, with large dark brown head; the head seems to be almost as large as the egg from which the larva has emerged, and is considerably larger than the second segment; the body tapers to the anal extremity. Each larva at once takes possession of the upper extremity of a leaf, where it spins a small web on which it stands; it nibbles the edge of the leaf on either side of this web in an irregular fashion, but always returns to the web it first spun. It grows very slowly, but its body becomes of a more decided green, similar in shape to that of the larva of *Thecla betulæ*, and is finely irrorated with yellow; these yellow spots gradually become confluent on the sixth segment, where they form a yellow crescent.

On August 18th I noticed that some seemed as if they were undergoing a change of skin, as they remained with the head and anterior segments raised from the leaf and had ceased feeding; immediately behind the head a yellowish appearance of the skin began, which increased day by day, and on the morning of the 21st two had completed a moult. Never was a transformation more extraordinary; in place of a dark round head, with scarcely any depression between the lobes, there appeared a pale greenish red head with lobes prolonged into two long horns which stretched out in front, in length equal at least to a third of the whole larva, and studded by short spines; the colours were brighter, and the fine spots of yellow were more distinct. The larvæ principally feed at night, and remain at rest on their webs at the extremities of the leaves during the day. On September 7th the larvæ commenced a *second* time to change their skin, which process takes about three days.

During the week ending Saturday, October 9th, rain fell in torrents, and during the whole of this time the larvæ remained at the extremity of the leaves, and were more than half submerged in the water hanging from the leaves. One by one the larvæ disappeared towards the end of October; but I failed to trace

them to their winter quarters, and concluded that they had sought refuge amongst the leaves which had accumulated at the bottom of the gauze bag. At intervals during the winter I searched for them, not, however, removing the bag; but it was not until March 12th of this year that I discovered their whereabouts. I found that each larva had spun a little silken mat at the bifurcation of a branch from the main stem, and had changed to a dirty brownish green colour, almost exactly the colour of the stem of the willow; they were now about half an inch in length, and the horns on their heads were carried straight out in front; they remained in this position until the first week of April, at which time the willow-leaves had become fairly developed and most of the catkins had fallen. On April 12th they had all left their *hybernacula*.

On May 5th many of them commenced casting their skins for the third time, and completed this operation on the 8th of that month; after this change they resumed the brownish green colour which they had lost while hibernating. On May 22nd some began to change their skins for the fourth time, and effected this by the 26th. On June 15th one commenced to pupate, and had effected this in three days and a half; on the 19th I brought indoors fourteen pupæ.

The pupa is attached by the last segment to the under side of a leaf, which leaf has been firmly attached to the stem by means of silk spun by the larva completely round the footstalk, after the fashion pursued by various silk-producing Bombyces. In addition to this, the edge of the leaf is also attached by silken bands to the stem, so that it can be but slightly moved by the wind. If disturbed, the pupa gives a very sudden and violent jerk.

On July 4th the imagos commenced to emerge, and the last put in an appearance on July 13th. The proportion of the sexes were three males to two females. Some are curiously mottled, and the amount of purple iridescence varies greatly. I have this year taken in the Sussex woods males which were similarly mottled; this gives to perfect specimens an appearance of being weather-beaten.

The following list of dates indicate the chief transformations already mentioned:—1880, July 19th and 20th, females captured; 25th, eggs first noticed. August 11th, larvæ emerge; 21st, first moult completed. September 10th, second moult completed.

1881, April 12th, larvæ left winter quarters. May 8th, third moult completed; 26th, fourth moult completed. June 19th, many in pupa. July 4th, imagos first appear; 13th, last imago appeared.

I should mention that during the last week in June I discovered one larva, in plump condition and with good appetite, which apparently had not changed its skin since the winter; it was still of the dirty brownish green colour, and, except that it had filled out, it had not grown; this I hope to find when I put a fresh net over the bush, and shall then bag separately. If there be others in a similar state, it may happen that some larvæ of *Apatura Iris* take more than a year to complete the cycle of their existence. If this be so, why may not larvæ of other species be subject to similar retardation? and a fresh point would thus be added to the consideration of the periodicity of appearance of certain species.

Dartford, August, 1881.

EUPITHECIA JASIONEATA, CREWE: A SPECIES NEW TO SCIENCE.

BY REV. H. HARPUR CREWE, M.A.

SOME three years since I received from Mr. Ficklin, of Keynsham, near Bristol, specimens of a *Eupithecia*, which he had bred from larvæ taken the previous September, in North Devon, feeding in the seed-heads of *Jasione montana*. At first sight I was disposed to consider them a variety of *Eupithecia castigata*, and in this view Mr. Buckler, who also saw the specimens, concurred. I forbore, however, to give any definite opinion till I had seen the larva.

The same autumn Mr. Ficklin again took the larva in North Devon, and very obligingly forwarded specimens both to Mr. Buckler and myself. We at once saw that they bore no likeness whatever to *E. castigata*, but, though smaller and stouter, most closely resembled the larva of *E. campanulata*. As, however, the perfect insect was totally distinct from the latter species, I felt convinced it must be a species new to Britain.

Through the kindness of Mr. M'Lachlan the perfect insect has recently been carefully examined by M. Dietze, of Hamburg, who knows more probably about the continental *Eupitheciæ* than

anyone else. He is unable to identify it with any known species, and considers it new to Science.

With the consent, therefore, of Mr. Ficklin, to whom the whole merit of the discovery belongs, I propose to name it *Eupithecia jasioneata*.

In general appearance the perfect insect closely resembles *E. castigata*, but the ground colour is a much paler ashy grey. The dark central lunule of the front wing is round, not narrowed; and before the hind margin there is a very conspicuous, almost uniformly broad, acutely angled, pale whitish line, which forms the most distinguishing characteristic of the insect.

Description of the larva of *Eupithecia jasioneata*:—Short and stout; ground colour pale ochreous-brown; central dorsal line dull olive-brown, interspersed with lozenge-shaped spots of a similar colour—the latter become merged into the central line on the anal segments; head blackish; spiracular lines indistinct, yellowish on each side, slanting brown markings. Whole larva wrinkled, rough, and sparsely studded with yellowish warts and hairs. Feeds in September on seed-heads of *Jasione montana*.

Perfect insect appears in May.

Drayton-Beauchamp Rectory, Tring, August 6, 1881.

A MONTH IN THE NEW FOREST.

By REGINALD E. SALWEY.

EARLY in July, the settled fine weather having tempted me down to the New Forest, I installed myself at Brockenhurst on the 8th of the month, with the determination of working the locality thoroughly until August. The first thing I noticed was the unusual abundance of the Diurni. As I strolled about the rides *Argynnis Paphia* rose in great numbers from the brambles, accompanied by almost as many *Limenitis Sibylla*. Both species were in splendid condition on the 9th, and the variety of the former, *Valezina*, equally fine, but not so plentiful as report had led me to expect. A good proportion of my specimens of this beautiful variety were taken *in copulâ*, of course with males of the ordinary type. It struck me at the time that *Valezina* differed

considerably from the type of *A. Paphia* in its habits, being decidedly more alert on the wing, flying higher, and more wary than the typical females. All three of these butterflies appeared to suffer from the attacks of dragonflies, which took a savage delight in snapping pieces out of the wings of *A. Paphia* especially. The fiery colouring of the latter irritated them, I presume, and roused their pugnacious tendencies. A few days later *Satyrus Hyperanthus* abounded, and *Gonepteryx rhamni* almost rivalled *L. Sibylla* in numbers by the middle of the month. On the 29th I saw about a dozen *Apatura Iris* flying round high oaks and Scotch firs, but sticks, stones, and clods of earth availed not at all to bring their imperial majesties within reach of the long net I had provided for them. I believe a few specimens were taken at old sugar, but, as far as I know, very few on the wing. In all, I sighted twenty-four species of Diurni during my stay; not a bad percentage in a month, considering our limited British list.

Boarmia roboraria emerged rather early this year, and my specimens are consequently not in first-rate order. *B. repandata* var. *conversaria* proved scarce, and *Acidalia inornata* only put in an appearance at sugar, and then very sparingly; *A. immutata* no better; and although I devoted several mornings to "Bank" and "Denny," and worked hard for *Cleora glabraria*, I could not make up a half dozen, and was obliged to console myself with a few *C. lichenaria* and an unlimited supply of *Liparis monacha* off oak and beech; of these I took some handsome dark-banded forms.

This Geometer working was somewhat disappointing, *Ennomos angularia* (normal types), *E. erosaria*, *Macaria liturata*, *Fidonia piniaria* and *Melanthia albicillata* being the only other species worthy of note. The "footmen" I found represented by *Lithosia quadra*, *L. helveola*, and *L. complanula*. The first species was very abundant; I picked out more than a hundred pupæ of it from the crevices of oak trunks,—from which I have reared as many ichneumons as moths,—and afterwards the perfect insect came freely to sugar, as did *Nola strigula*, of which I also secured a good number at rest in the daytime. One expedition after *Zygæna meliloti* sufficed to procure me a nice series, and I was loth to take more, as the species is very hard worked, and I fear in danger of extermination.

I sugared persistently in Hollands Wood and New Park, and was rewarded by three *Triphæna subsequa*, *Leucania turca* ad. lib.,

a few *Diphthera orion*, *Acronycta ligustri*, *Epunda viminalis*, and three *Aventia flexula*, in addition to the usual crowd of common summer Noctuæ; but "Where is *Dicycla oo*?" was the cry of every collector I met with; when will this erratic species appear again? *Catocala promissa* first came to sugar on the 13th, and I have now upwards of thirty perfect specimens in my store-boxes. The almost equally beautiful *C. sponsa* abounded at Bolder Ford by the 22nd, and to bottle forty of this grand insect, as well as a few *C. promissa*, before I had occasion hitherto to light the lantern, was certainly one of my most exciting entomological experiences. Of other local insects in the Forest I have only to add single specimens of *Limacodes asellus* and *Acosmetia caliginosa*.

Sometimes I turned my attention to Brockenhurst Heath and the adjoining bog, which made a pleasant change in the collecting. On the heath I found *Pseudopteryx cytisaria*, the peat form of *Gnophos obscurata*, and *Selidosema plumaria*, plentiful in the daytime; and I had some good "spurts" after *Heliothis dipsacea*, which interesting insect was not abundant, and difficult to secure in good condition. There also *Hyria auroraria* turned up, and at dusk enough *Acidalia straminata* to make out a series. *Acidalia emutaria* was plentiful on the bog at sunset, a few *Leucania pudorina*, and towards the close of my visit one *Nudaria senex* only, and a nice lot of *Nonagria despecta*. *Geometra papilionaria* occurred near the Lymington River, and I have brought away a very fine series, some attracted by light, others found at rest by day, and after their first flight at dusk.

By the 1st of August the collecting dropped off, and I therefore devoted some time to larva beating, which seemed unprofitable; a solitary larva of *Acronycta alni* and three of *Stauropus fagi* are all I can report of consequence. *Demas coryli* larvæ were abundant. By means of the beating-stick I worried out some very pretty forms of *Sarrothripa revayana*; and by the time I furled my net on the 5th of August, and contemplated the shattered remains of my umbrella, I had ample reason to be satisfied with my first visit to the New Forest.

I must not omit to add that I am indebted to Mr. W. Harper for much valuable aid in my labours, and to the courtesy of Mr. W. Jobson for a knowledge of some special localities.

Runnymede Park, Egham, August 13, 1881.

COLLECTING IN NORTH DEVON.

BY RICHARD SOUTH.

As far as I can learn, there are few resident collectors of insects in the whole district of North Devonshire. In a note from a gentleman at the United Services College, Westward Ho! I am informed they have a Natural History Society in that establishment, some of the members of which are aspiring entomologists. At Barnstaple I understood there were two gentlemen of that town who had collections of Lepidoptera; but I only met with one of them, and he was good enough to show me his collection, which consisted mainly of butterflies, and they were strong in the commoner species of the genus *Vanessa*. The insects were set and arranged more in accordance with individual fancy than scientific requirements. In his collection was a curious example of *Acherontia Atropos*, which at once caught the eye, and appeared familiar and yet strange. A closer inspection instantly revealed the cause of my imperfect recognition. *Atropos* was before me certainly, but, having lost its own hind wings, a pair of the posterior wings of *Papilio machaon* had been substituted; hence my momentary mystification. This "hybrid" was referred to in a recent law case by its manufacturer as "*Acherontia atropo-papilio-machaon*."

During June I had a few days at Instow Sand-hills and Braunton Burrows, but at neither place did I see the particular insects for which I was searching, viz., *Micra ostrina* and *M. parva*; in fact, even the generally common moths were scarce at those places. South-westerly gales and much rain had, I expect, either destroyed or driven away insects from those exposed localities. The flora of the district is extremely rich, but I am quite unable to say from my own experience what species of Lepidoptera are to be found there.

Throughout the month of June I used sugar nearly every night in various inland woods and on the coast, always putting on the "mixture" at or before 8.15 p.m. while still light. Some nights the wind was blowing hard, on others it was quite still, but generally the evenings were warm. Moths were always numerous as regards certain species, such as *Triphaena pronuba* and *Aplecta nebulosa*; of the latter I once counted seventeen on

one tree-trunk, but among the large number of this species which came under my notice I only detected one variety, and that not a very striking one either. *A. herbida* was fairly plentiful in one or two woods; it also turned up in my breeding-cages. *Thyatira derasa* and *T. batis* were both of frequent occurrence. The genus *Acronycta* was represented by *A. rumicis* and *A. ligustri* only. *Apamea gemina*, *Noctua brunnea*, *Hadena adusta*, and *H. thalassina* were all common, and now and then the banded variety of *Boarmia repandata* would enter an appearance, and was duly boxed; but I got most of my examples of this variety by mothing at dusk. One evening I netted four successively in fewer minutes. Occasionally I found a specimen or two at rest on tree-trunks in the daytime. I noticed this form of *B. repandata* is not so skittish when at rest or at the sugar as the normal type. I have even touched this variety when on a tree, and it has simply turned itself round; changed front, in fact, and quietly settled itself for another snooze. If one only passes within a yard or two of the typical form of this species, it is off and away. This difference of habit is curious, seeing that the variety is so much more conspicuous when at rest than the ordinary type; and would be of importance in separating the two forms into distinct species, if other circumstances did not point so conclusively to the contrary. I may add that I have also bred the variety from a very few larvæ which I took in the spring.

In my April and May notes I mentioned *Emmelesia affinitata*; I must now couple with it *E. alchemillata*, and state that both species were generally common among *Lychnis*.

Eupithecia pulchellata larvæ were very plentiful in flowers of foxglove growing on stone-faced embankments of hedgerows; the first lot were found June 7th. The appearance of the imago of this species was somewhat erratic; one or two specimens were met with early in May, then not again till about the middle of June, and a few more July 6th and later. Although the food-plant of *E. plumbeolata* was abundant in some woods, I got very few examples of the insect; these were mostly netted at dusk. *E. lariciata* abundant in larch woods. *E. debiliata* was common in those woods where bilberry grew, but the majority of specimens were worn before I found out the habits of the imago; however, I got a nice series in capital condition. I collected a lot of what I thought at the time were larvæ of this species, and

was greatly disappointed to breed large numbers of *Ypsipetes elutata* and very few *E. debiliata* from them. It would seem that the larval habits of both species are very similar; I examined a few of the curled leaves first, and satisfied myself that they contained a "pug" larva, and then thought it would be shorter work to pick all the curled bilberry-leaves I met with; but the result was as related. By the way, the bilberry-fed *Y. elutata* seems to me uniformly smaller, more distinctly marked, and altogether a prettier insect than those fed on willow.

Melanthia albicollata, *Melanippe galiata*, and *Eucosmia certata* and *S. undulata* were met with sparingly. *Cidaria populata* was a pest in most woods. *Hyppena crassalis* occurred between the 5th and 20th of June; one or two examples were taken at sugar, but the larger number were beaten out of heather or netted as they flew along wood paths at dusk.

Botys terrealis was often beaten out of bushes in the neighbourhood of golden-rod, and about two dozen larvæ and pupæ of *Phycis subornatella* were found among wild thyme growing on rocks near the sea. Larvæ of *Pempelia consociella* and *P. tumidella* were found on oak, the former commonly.

In July, all the species mentioned as visiting the sugar last month, the genus *Hadena*? excepted, were to be taken; the only additions thereto were *Triphaena fimbria*, *Caradrina alsines*, *C. blanda*, and *Cosmia pyralina*. The *Caradrinæ* were more partial to flowers.

I was fortunate enough to capture *Toxocampa cracca*, and to breed others from larvæ found earlier in the season. This insect is exceedingly local; its head quarters are not often invaded by the entomologist, or perhaps indeed by any one, as the particular spot is only attained at the expense of much labour. I do not know that I should have visited the place, only I had set myself the task of finding the species, and I determined to leave no likely or unlikely cranny unexplored. Of course there were places which from force of circumstances I was obliged to pass by without inspection, but these were few. The casualties to larvæ were various, only thirty-five per cent. reaching the perfect state. Emergence from the pupa takes place between 6 p.m. and 6 a.m. I have noted imagines drying their wings at various times between the hours named, but have never seen them so employed at any other time.

All the genus *Hepialus* were observed this month. *H. velleda* was found on the moor, but very local. *Calligenia miniata* was not very plentiful.

Cidaria populata came out in extra force the earlier part of this month, and assisted the more numerous *Y. elutata* in bewildering the collector and preventing the capture of the more aristocratic members of the Geometrina, supposing such to have been present.

About the middle of August the second brood of *Eupithecia pumilata* were obtained by beating furze-bushes, and towards the end *Larentia olivata* turned up. *Cidaria immanata* and *C. prunata* were not uncommon, neither was *Botys asinalis*; this last is an insect that requires breeding to get really fine specimens; I took a good number, but many examples were too poor in condition to be worth setting. In the foregoing notes I have not set down any of the Micro-Lepidoptera I met with, but will do so shortly in a separate paper.

12, Abbey Gardens, St. John's Wood, N.W., August 17, 1881.

INTRODUCTORY PAPERS ON ICHNEUMONIDÆ.

BY JOHN B. BRIDGMAN AND EDWARD A. FITCH.

No. II.—ICHNEUMONIDÆ (*continued*).

THE *Ichneumones platyuri* have been tabulated by Holmgren, as follows:—

- A. Bend of the 1st segment of the abdomen elevated in the middle. - - - Gen. 1. *Probolus*, Wesm.
- B. Bend of the 1st segment of the abdomen not elevated, sometimes bicarinated.
 - a. Petiole of abdomen depressed, and slightly flattened above.
 - * Sides of scutellum immarginate. Gen. 2. *Eurylabus*, Wesm.
 - ** Sides of scutellum entirely, or beyond the centre, marginated.
 - † Antennæ of male very strongly serrated within.
 - Gen. 3. *Pristiceros*, Grav.
 - †† Antennæ not serrated, at the most slightly denticulated.
 - Gen. 4. *Platylabus*, Wesm.
 - b. Petiole of abdomen somewhat thickened, rather depressed; spiracles of metathorax circular.
 - Gen. 5. *Apæleticus*, Wesm.

Following Marshall's Catalogue *Probolus alticola* has been included in the table of *Amblyteles*; for reference the genus is also included in the above table, as Taschenberg, Holmgren, Tischbein and Brischke are not agreed with Wesmael in sinking his own genus, but it is not necessary to again refer to the species here.

EURLABUS, *Wesm.*

- A. Abdomen ovate or elliptic. Hind tibiæ and tarsi incrassated (male). Black; legs red; coxæ, trochanters and apex of hind tibiæ and tarsi, black. - - - - - 2. *dirus*, $7\frac{1}{2}$ —8 lines.
- B. Abdomen linear or oblong-fusiform. Hind tibiæ and tarsi not incrassated.
 - a. Tibiæ and tarsi of hind legs entirely red or orange (male and female). Ring of antennæ, marks on face, thorax and scutellum, yellowish; legs red. - - - - - 4. *larvatus*, $7\frac{1}{2}$ —11 lines (*h*, *t*).
 - b. Greater part of hind tibiæ and tarsi black; coxæ and trochanters black; rest of legs red. Scutellum and abdomen black (males and females).
- * 3rd segment of abdomen transverse. - 1. *torvus*, $5\frac{1}{2}$ —6 lines.
- ** 3rd segment of abdomen quadrate. - 3. *tristis*, $5\frac{1}{2}$ —6 $\frac{1}{2}$ lines.

Our four species of *Eurylabus* are all rare in Britain; *E. torvus* is the least so. Mr. Marshall gives *E. larvatus* as only reputed British, and although in Desvignes' Museum Catalogue (1856) he did not include it in his 1870 Catalogue. There are two beautiful specimens in the British Museum from Desvignes' collection, but of doubtful origin; last year, however, Mr. F. D. Wheeler bred three males from *Stauropus fagi*, whose larvæ were collected in the New Forest. *E. intrepidus*, *Wesm.*, given by Marshall as a variety of *E. larvatus*, is now considered a good species; it is not British. On Wesmael's plate illustrating the Ich. platyuri, *E. torvus*, female, *E. dirus*, male and head magnified, are figured. *E. larvatus* is figured by Christ. Our four species have all been bred, from the following hosts:—

- 1. *torvus*, *Wesm.* from *Lithosia rubricollis*; Marshall.
- 2. *dirus*, *Wesm.* „ *Eriogaster lanestris*; Sauveur, Marshall, Bignell, ? Wilson. *Trichiura cratægi*; Giraud.
- 3. *tristis*, *Gr.* „ *Trachea piniperda*; Brischke. *Dianthœcia capsicola*; Brischke.
- 4. *larvatus*, *Christ.* „ *Dicranura vinula*; Gir. *Stauropus fagi*; Wheeler.

PRISTICEROS, *Grav.*

Scutellum black, sometimes white at the apex ; abdomen black.

Ring of antennæ, orbits of eyes, and two spots on the metathorax, white ; legs black.

Brischke says the colour of the female is like the male, that the apical margins of 5th to 7th segments are narrowly white, but that the antennæ of the female are not serrated (male and female).

1. *serrarius*, $5\frac{1}{2}$ —6 lines.

This rare species—of which Gravenhorst wrote “an Europæum,” and Wesmæl knew only one specimen, captured near Diest—is beautifully figured, with an antenna magnified, on Wesmæl’s plate of the *Ich. platyuri* (figs. 7, 8). It was regarded by Marshall as only reputed British ; there is, however, a specimen in the British Museum, from Desvignes’ collection, which was taken by the late Fred. Smith in Coombe Wood, in 1839. It is doubtless to this that Wesmæl refers when, in the N.B. to the explanation of his plate, he says : “Depuis l’impression de ma notice sur les *Ichneumones platyuri* (Bull. du 3 Déc. 1853), j’ai reçu une lettre de M. Walker, où il m’apprend que M. Desvignes a aussi découvert, aux environs de Londres le *Pristiceros serrarius*, Grav., ainsi que mon *Eurylabus dirus*, dont il connaît même les deux sexes.” Brischke bred a male from *Boarmia consortaria* pupa ; and the female, referred to above, was captured on August 20th, 1876.

PLATYLABUS, *Wesm.*

SECTION 1.—Thorax and abdomen blue-black.

Antennæ white-ringed ; front legs pale. 4. *nigrocyanus*, $4\frac{1}{2}$ lines.

SECTION 2.—Abdomen black.

A. Hind legs black ; antennæ white-ringed ; scutellum black (a var. of female with pale apex). - - - 2. *tenuicornis*, 5 lines (s).

B. Hind femora red.

a. Antennæ of female white-ringed : apex of scutellum pale, sometimes black. Gastrocæli deeply sunk. 6. *pedatorius*, 4—5 lines (s, l).

b. Scutellum and antennæ (a var. of female, sometimes with 12th and 13th joints white above), incision of 2nd segment, or 1st to 3rd, reddish ; a yellow spot at the apex of the cheeks against the mandibles. Gastrocæli almost obsolete. - *Thedenii*, 3 lines.

SECTION 3.—Abdomen black, all or some of the segments with the apical margins entirely or partly white. Scutellum entirely, or apex, white.

A. Greater part of femora, especially the hinder ones, black ; antennæ of female white-ringed. - - - 3. *dolorosus*, $4\frac{1}{2}$ —5 lines.

B. Greater part of femora red, or all red ; antennæ white-ringed.

5. *variegatus*, $4\frac{1}{2}$ —5 lines.

SECTION 4.—Abdomen more or less red ; apical segments not pale marked.

A. Thorax and abdomen more or less red or chestnut, as well as greater part of legs ; antennæ of female white-ringed. 1. *rufus*, 5 lines.

B. Thorax black.

a. Scutellum black ; ring of antennæ white ; 1st and 3rd and base of 4th abdominal segments red ; legs nigro-fuscous.

13. *semirufus*, $3\frac{1}{4}$ lines, female.

b. Scutellum white ; apical margins of 1st and 3rd segments red ; 2nd red, with a brown dorsal spot ; front coxæ and trochanters marked with white ; femora and tibiæ red, apex of hinder black.

9. *tringulatus*, $3\frac{1}{2}$ lines, male.

SECTION 5.—Abdomen red and black, with the apex marked with white. Scutellum white or whitish (except in Nos. 10 & 11).

Legs red ; coxæ, trochanters and apex of hind femora and tibiæ black.

A. Gastrocæli obsolete ; metathoracic spiracles linear.

Abdominal segments, 2nd and 3rd red, 1st and 2nd partly so ; apex of 5th to 7th and ring of antennæ white.

12. *errabundus*, 4— $4\frac{1}{2}$ lines.

B. Gastrocæli distinct.

a. Metathoracic spiracles oval.

Segments, 1st to 4th or 5th, red ; petiole often black ; 6th and 7th extreme apical margins and ring of antennæ white.

7. *orbitalis*, $3\frac{1}{2}$ — $4\frac{1}{2}$ lines.

b. Metathoracic spiracles round.

* Scutellum white.

Segments, 1st to 4th or 5th, red ; 6th and 7th white at the apex ; antennæ of female white-ringed.

† Antennæ of male white-ringed. 8. *volubilis*, 3 lines (*l*).

†† Antennæ of male not white-ringed. 14. *pactor*, $2\frac{1}{2}$ —4 lines.

** Scutellum black ; sometimes red in *dimidiatus* ; antennæ white-ringed ; segments, 1st to 3rd, red (a var. of male in *nigricollis*, with 1st and part of 2nd black).

† 5th to 7th abdominal segments with wide white apical margins.

Thorax and hind coxæ more or less red ; sometimes in the male black. 10. *dimidiatus*, 3—4 lines (*t*, *l*).

†† 5th to 7th abdominal segments with narrow white apical margins.

11. *nigricollis*, $2\frac{3}{4}$ — $3\frac{1}{2}$ lines (*a*).

This genus is rather rich in species, and as there is but little sexual variation in them this is not mentioned in the table. It is arranged by Holmgren according to the shape of the metathoracic spiracles (in some species they are circular), the absence or presence of metathoracic spines, the shapes of the scutellum and gastrocæli ; we have preferred following Wesmael's colorational grouping, as more in uniformity with Desvignes' divisions, previously used in this family. None of our species of *Platylabus*, except perhaps *P. pedatorius*, can be called common ; bright

specimens of *P. dimidiatus*, which varies much as to colour, are amongst our most striking species. *P. Thedenii*, Holmgr., has been added to the British fauna (Trans. Ent. Soc. Lond. 1881, p. 145; Entom. xiv. 139); but as not half of the North-west European species are included in Marshall's Catalogue, doubtless many additions are yet to be made. *P. rufiventris*, a species which certainly ought to occur here and which has been bred from *Macaria liturata* and *Halia wavaria*, is well figured on Wesmael's plate of the 'Ichneumones platyuri Europæi' (fig. 10). The British species which have been bred are as follows:—

- | | |
|-------------------------------------|--|
| 2. <i>tenuicornis</i> , <i>Gr.</i> | from <i>Platypteryx curvatula</i> *; Brischke. |
| 3. <i>dolorosus</i> , <i>Gr.</i> | „ <i>Geometer</i> ; Brischke. |
| 4. <i>nigrocyanus</i> , <i>Gr.</i> | „ <i>Fidonia piniaria</i> ; Rondani. <i>Trachea pini-perda</i> ; Rond. <i>Plusia festucae</i> ; Stephens. |
| 6. <i>pedatorius</i> , <i>Fabr.</i> | „ <i>Hybernia defoliaria</i> ; Brischke. <i>Eupithecia sobrinata</i> ; Goossens (Giraud). <i>E. nana</i> ; Brischke. <i>E. exigua</i> ; Brischke. <i>E. pimpinellata</i> ; Brischke. <i>E. innotata</i> ; Gir., Brischke. <i>E. subnotata</i> ; Golding-Bird. <i>E. scopariata</i> (<i>Guinardaria</i>)*; Gir. <i>Pelurga comitata</i> ; Richter (<i>Gravenhorst</i>). |
| 7. <i>orbitalis</i> , <i>Gr.</i> | „ <i>Fidonia piniaria</i> ; Perris (Gir.). <i>Lobophora sexalata</i> ; Brischke. <i>Thera juniperata</i> ; Brischke. <i>Melanippe fluctuata</i> ; Brischke. |
| 8. <i>volubilis</i> , <i>Gr.</i> | „ ? <i>Psyche viciella</i> (<i>Stettinensis</i>)*; Hering. |
| 10. <i>dimidiatus</i> , <i>Gr.</i> | „ <i>Melanippe fluctuata</i> ; Brischke. <i>Depressaria heracliana</i> ; Boie. <i>D. depressella</i> ; Rond. |
| 12. <i>errabundus</i> , <i>Gr.</i> | „ <i>Anticlea sinuata</i> ; Brischke. <i>A. rubidata</i> ; Brischke. |
| 14. <i>pactor</i> , <i>Wesm.</i> | „ <i>Eupithecia absynthiata</i> ; Brischke. |
| <i>Thedenii</i> , <i>Holmgr.</i> | „ <i>Emmelesia unifasciata</i> ; Elisha. |

APÆLETICUS, *Wesm.*

Scutellum pale; abdomen red, in male base black; femora and tibiae red, apex of hinder black, coxæ and trochanters of the female red; metathorax bispined; post-petiole closely punctured.

1. *bellicosus*, 3 lines.

The female of this species is beautifully figured by Wesmael. It is our only representative of the genus (Wesmael describes five species), and is apparently very rare in Britain. There is a single specimen in the British Museum from Desvignes' collection. We are not aware that any species of *Apæleticus* has been bred.

ENTOMOLOGICAL NOTES, CAPTURES, &c.

ARGYNNIS ADIPPE var. CLEODOXA.—Mr. Turner, a brother collector, and I were at Arnside, near Grange, on July 16th, and had the pleasure of taking *Argynnis Adippe*; when what should turn out after a shower of rain but the variety described in Newman's 'British Butterflies' as *Cleodoxa*, in splendid condition. Should any entomologists passing through Lancaster wish to see the specimen, I shall be happy to show them the same.—G. LOTHAM; Briary Street, Lancaster, August 8, 1881.

APATURA IRIS var. IOLE, VANESSA ANTIOPA, AND XYLOMIGES CONSPICILLARIS.—I have been requested to give information of the capture of another specimen of *Apatura Iris* var. *Iole* by Mr. Packman, of Dartford, at the same place as the one mentioned by me last month, and a few days subsequently thereto. It is rather smaller than the normal insect. Also that a specimen of *Vanessa Antiopa* and two of *Xylomiges conspicillaris* were taken by the same collector; the former on 1st of April last, the other two in the following May.—E. SABINE; 17, The Villas, Erith, Kent.

"IS VANESSA POLYCHLOROS THE PROTOTYPE OF *V. URTICÆ*?"—With much interest I read the article under the above title in the August number of the 'Entomologist,' and have been tempted to make a few remarks thereupon. Whilst fully indorsing Mr. Butler's views respecting the mutual progenitor of *Vanessa Polychloros* and *V. urticæ* being *V. C-album*, it seems to me a significant fact in support of his interpretation of the case, that *V. C-album* is undoubtedly becoming scarcer in Great Britain, and is perhaps on the road to utter extinction. If this be the case it is not unreasonable to suppose that *V. Polychloros* and *V. urticæ* have structural or other advantages over *V. C-album*. One of these advantages may be the greater area of the wing, resulting from the absence of the characteristic indentations of *V. C-album*; for it is difficult to perceive how the peculiar contour of the wings in the latter insect can be an advantage to its possessor. It would be interesting to know whether *V. C-album* is becoming less common on the continent or elsewhere.—G. COVERDALE; 2, Cannon Street, City.

SPHINX PINASTRI NEAR IPSWICH.—I beg to inform you that I took *Sphinx pinastri* from a pine in the Asylum grounds, near

Ipswich, about 10 a.m. on July 22nd. I had sugared the tree on the previous evening.—F. W. AGER; Borough Asylum, Ipswich.

[A drawing of this insect was submitted to me for identification, and proved to be that of *Sphinx pinastri*.—J. T. C.]

HEPIALUS VELLEDA IN SURREY.—In June, 1880, I took, near here, a worn obscurely-coloured “swift,” which looked to me very like *Hepialus velleda*; and on visiting the same locality on the 18th inst. I obtained three more examples, this time undoubtedly of that species. They were on the wing soon after sunset, rather later than *H. hectus*, and flew much in the manner of Noctuæ.—J. EVERSLED; Wonersh, near Guildford, June 20, 1881.

NOLA STRIGULA AT SUGAR.—At Abbot’s Wood, Sussex, on July 14th of this year, this pretty little species was abundant at sugar; my friend Mr. Smallwood and I captured about forty specimens, most of which were in first-rate condition. We found it almost as abundant on the 19th, but not nearly so fine; and in another week it had almost disappeared. The local collectors were surprised to hear of its being so plentiful, as it usually occurs only sparingly. For the information of others who may take this species I may add that it should be killed as soon as possible after capture, as it decidedly objects to the confinement of the chip-box.—CHAS. F. THORNEWILL; The Soho, Burton-on-Trent.

ENNOMOS AUTUMNARIA, *Wernb.* = ALNIARIA, *S. V.*—During the month of August I have had the very great pleasure of breeding this fine and rare British moth from eggs procured from a female moth, taken at a gas-lamp, at Deal, by my friend Mr. Harbour, who most kindly sent me them last autumn. The eggs commenced hatching April 27th, and continued to do so at intervals till May 20th. They were fed on birch, and grew very slowly. By the end of June the earliest larvæ were full grown, and most curious and twig-like animals they are. I could hardly persuade some of my non-entomological friends that they were really caterpillars, until I touched them and made them move. The first pupated during the first week in July, and the last on August 12th. The first imago appeared July 25th; and to this date, August 17th, I have bred twenty-four magnificent moths. I was fortunate enough to secure a batch of fertilised eggs from two remarkably handsome insects, so that I have great hope of being able to supply this much-coveted insect to most of my friends next year.—W. H. TUGWELL; 3, Lewisham Road, Greenwich.

BOLETOBIA FULIGINARIA.—I have another to record: a very fine male specimen was again taken, two days after that of our friend Mr. Wellman's, by Mr. Upton, of Bermondsey, and is now in my hands, and will be exhibited by me at the next Aquarium meeting.—J. TRIMMER WILLIAMS; 23, Old Kent Road, London.

BOLETOBIA FULIGINARIA.—I am happy to be able to add one more to the list of captures of the above rarity. My gardener took a female in a box, in a cellar at Lewisham which had been undisturbed for two or three years. Being in some doubt as to the insect, I trespassed on the courtesy of my neighbour, Mr. Jenner Weir, who was good enough to assure me of its genuineness without a moment's delay. Another empty cocoon was in the same box, but, though we have sugared and searched carefully, we have not been able to tempt its former occupant to our bottle. Both insect and cocoon are in an almost perfect condition, the antennæ only being slightly shortened.—FRED. W. SMITH; Hollywood House, Blackheath, August 22, 1881.

BOLETOBIA FULIGINARIA.—A few days ago I caught a small moth in a cellar on a very old box, and not knowing what it was I asked some of my friends. It proves to be *Boletobia fuliginaria*.—A. NOAKES; 1, South Vale Terrace, Lewisham, August 8, 1881.

[This and the preceding appear to refer to the same species.—ED.]

FOOD-PLANTS OF ACIDALIA IMMUTATA.—The larva of this species is, I believe, little known. Whilst collecting at Wicken Fen at the end of May this year I took two larvæ, one feeding on *Valeriana officinalis*, the other on *Spiræa ulmaria*. They spun up within a few days, and appeared as imagos at the end of June.—GILBERT H. RAYNOR; Hazeleigh Rectory, Maldon, Essex.

COREMIA QUADRIFASCIARIA.—In June last a specimen of this local moth was taken by a friend of mine at Danbury, near Chelmsford, in Essex. This, I believe, is a new locality for it.—H. CUBISON; 29, Jeffrey's Road, Clapham, August 12, 1881.

EUPITHECIA JASIONEATA, Crewe.—In June, 1878, I had the pleasure of rearing a long series of an *Eupithecia* which puzzled me much at the time. I sent several specimens away to correspondents as a new species or variety of *E. castigata*, with a query after them. The larvæ were found feeding on *Jasione montana* by my collectors, while they were working near Valentia, South-

west Ireland, in September, 1877. I have this day received from Mr. A. Ficklin, of Bristol, four specimens of a "pug" which he calls *Eupithecia jasionata* of Crewe. I immediately recognise them as identical with my specimens just mentioned. I did not see the larvæ my men found in Ireland, or I should have at once known they were of something new. The Irish specimens are a trifle browner than the English examples. The moth is easily distinguished from *Eupithecia castigata* by a uniformly broad white sharply-angulated line before the outer margins of the fore wings, and the central spot is more rounded than in *E. castigata*.—E. G. MEEK; 56, Brompton Road, London, August 22, 1881.

[Mr. Meek has given me an opportunity of examining the *Eupithecia* above mentioned. The Irish examples do not differ from those of Devonshire more than might be expected from two far apart localities, and they appear to be identical species. I remember that all the Valentia Lepidoptera collected at the same time were decidedly suffused with rich reddish brown.—J. T. C.]

TRIPHÆNA PRONUBA.—I see it noted that this is the "yellow under-wing year," *par excellence*, in the South of England, and its extreme and unusual abundance in the neighbourhood of Prestwich and the Manchester district generally leads to the conclusion that it is equally common over Great Britain this year. That they are a nuisance here is to use but a mild term. I notice that they are largely consumed by birds, hundreds of wings lying about testifying to this predilection. I have noticed fewer *Xylophasia polyodon* than usual this season.—J. COSMO MELVILL; Prestwich, August 2, 1881.

TRIPHÆNA SUBSEQUA.—On the 1st of July, 1881, I captured a fine example of *Triphæna subsequa* in my strawberry beds. I have since seen four other examples on the same spot, but, having no net with me at the moment, failed to secure them.—O. P.-CAMBRIDGE; Bloxworth, Dorset, August 1, 1881.

ACRONYCTA ALNI NEAR BURTON-ON-TRENT.—I have again the pleasure of recording a capture of the larva of *Acronycta alni*. It was beaten out of a low birch shrub by my friend the Rev. G. A. Smallwood, of Ashby-de-la-Zouch, during an excursion which we jointly made to-day to Cloud Wood, near Worthington, Leicestershire. The larva, a remarkably fine one, was full-fed.—CHARLES F. THORNEWILL; Burton-on-Trent, August 15, 1881.

DIANTHÆCIA CUCUBALI DOUBLE-BROODED.—It seems not generally known that *D. cucubali* is occasionally, at all events, double-brooded. I have just reared seven fine specimens from larvæ taken at Lewes about a month ago, having a few days previously taken an imago of the first brood in a somewhat worn condition. The fact is mentioned in Merrin's 'Lepidopterist's Calendar,' but I have not seen it elsewhere.—C. F. THORNEWILL; August 15.

TOXOCAMPA CRACCÆ.—During a recent tour through North Devon and Cornwall I called upon Mr. R. South, who had been collecting in the former neighbourhood for some time. He showed me, amongst other things, some remarkably beautiful specimens of this rare moth, some of which were then alive.—JOHN T. CARRINGTON; August 14, 1881.

LEPIDOPTERA AT DEAL.—It may interest some of the readers of the 'Entomologist' to know the result of a month's hard work entomologizing on the south-east coast, from June 26th to July 25th. The weather during most of the time was exceptionally fine and hot, and fortunately light S.W. winds. The sand-hill specialities were in force; *Lithosia pygmeola* was by no means rare, and in beautiful condition, as was *Melia anella*. This obscure species was to be found almost every evening running up and down the grass and rush-stems; it is supposed to breed in bees' nests, but I have never been able to verify this statement; it rarely seems to fly, but with half-opened wings scuttles about the tufts of grass. The fine weather was just suited for the very local *Acidalia ochrata*, and I succeeded in getting a very fine series: this species is hard to take really fine; it gets its fringes rubbed quickly, from the habit of going into the dense tufts of grass; the specimens I bred are larger than those caught in their natural habitat. *A. emutaria* was not rare if worked for, but, as my time was taken up with other things, I only took about ten specimens. Of *A. immutata* two only were observed; *A. imitaria* occurred sparingly. *A. interjectaria* was common. *Nyctegretes achatinella* was very local, but not rare in one spot. *Nonagria despecta* was extremely abundant by the sides of a rushy ditch, and with some very pretty forms of *Schænobius forficellus*. A few specimens of *Scoparia lincola* occurred on old posts, and a few *S. pallida* were secured. *Platytes cerussellus* was abundant; and *Crambus alpinellus* occurred, but I was not successful in finding it. The prize of the sand-hills is *Nola centonalis*; this I worked

for daily, and secured in all thirty-four fine specimens; I totally failed to obtain eggs from any of my captures, but a friend I had taken to the locality, and showed him how to work this species, fortunately got two pairs *in copula*, and from them he obtained ova; from these I have now a few larvæ feeding. I secured what I have every reason to hope will prove a good take of *Dianthæcia albimacula* larvæ, from the coast near Dover. Folkestone Warren produced a few *Acidalia strigilata*, from which I obtained a good batch of ova; the larvæ are now feeding on *Clematis*. *Botys lancealis* occurred sparingly, as did *Eupithecia subumbrata*. *Emmelesia albulata* swarmed in places, and wasted specimens of *Procris globulariæ* were flying in the hot sunshine. I sugared twice only; common sand-hill Noctuæ were abundant, but nothing of any note was taken, though the general captures were interesting. The coast-line from Folkestone to Ramsgate is all splendid entomological ground, great rarities turning up when least expected; but I have never had such a take of gems as I had on this ground in 1877, although I have worked the locality thoroughly each year since.—W. H. TUGWELL.

LEPIDOPTERA AT LLANDUDNO.—Being at Llandudno from July 14th to 28th I paid a little attention to the Lepidoptera of the district; but as my health was not good at the time, not so much as I otherwise should have done. On two days I visited the Penmaenmawr mountains in the hope of finding *Acidalia contiguaria*, but was quite unsuccessful, although on the right ground for it. I believe the species has never been searched for at night, but, from the nature of the ground, I think it most likely that if searched for with a lamp, in the same way that other species of the genus are collected, it would be taken in great numbers. Had there been a sufficiently late train back to Llandudno, I should certainly have tried the method. The mountains yielded *Larentia cæsiata* in abundance, and *Gnophos obscurata* and *Cidaria populata* less commonly, with two common species of *Scoparia*; but little else. Eight or nine species of butterflies occurred in the district, but none of any rarity: *Satyrus Semele* was perhaps the most abundant species, occurring in great profusion on the Great Orme's Head and other mountains, and less commonly on the sandhills, where, too, a large bed of nettles was almost black with the full-fed larvæ of *Vanessa Io*. The moths included *Pseudopteryx cytisaria*, faded to a "white variety," on a mountain

at Penmaenmawr; *Acidalia promutata* on the Great Orme's Head; a very pretty dark-banded form of *Camptogramma bilineata*; *Emmelesia affinitata* and *E. decolorata*; *Eupithecia centaureata* and *E. absynthiata* on the sandhills; *Cidaria pyraliata*; *Eubolia palumbaria* very abundant; *Charæas graminis* on the sandhills. This latter species is evidently occurring in unusual numbers this year; it is now common in my own field, where I have not seen a specimen for some years. *Caradrina blanda* very common on ragwort flowers, and *Agrotis tritici* equally so on the sandhills; *Cucullia umbratica*; *Pyrausta punicealis*, common; *Herbula cespitalis*, abundant and in fine condition; *Crambus inquinatellus* and *Phycis subornatella* on the Great Orme's Head, the latter very worn; *Rhodophæa marmorella* beaten out of sloe, and also at ragwort bloom on the sandhills; besides many Tortrices and Tineæ. I notice some of your correspondents complain of the bad season; my own experience is that it is decidedly the best we have had for some years.—GEO. T. PORRITT; Highroyd House, Huddersfield.

NOTES ON *TRIBOLIUM CONFUSUM* AND *PRIOBIMUM CASTANEUM*.—A few days ago, on looking over some specimens of Coleoptera received from Northumberland in October last, I found several little living beetles, which had no doubt emerged from the other specimens, and which I at first took for *Tribolium ferrugineum*, Fab.; but upon a more careful examination I find them to be *Tribolium confusum*, Duv. *T. confusum* may be distinguished from *T. ferrugineum* by its more depressed appearance, and by its antennæ being gradually thickened towards the apex; whereas in *T. ferrugineum* they have a distinct club of four joints. Mr. H. E. Cox, in his 'Handbook of Coleoptera,' gives *Priobium castaneum*, Fab., as rare. I have taken it twice this year in an old tree stump near Barnet, having obtained in all six specimens.—A. S. OLLIFF; 36, Mornington Rd., Regent's Park, Aug. 3, 1881.

CLADIUS VIMINALIS LARVÆ DESTRUCTIVE TO NUT-STUBS.—The larvæ referred to in my note of last month under this heading (Entom. xiv. 188) are those of *Nematus* (*Cræsus*) *septrionalis*, L., and not of *Cladius viminalis*. This has quite a different larva, which I know well; but I was hurriedly led into error by an incorrectly-named figure.—EDWARD A. FITCH.

ERRATUM.—*Acidalia circellata*.—In my communication, "Lepidoptera on Thorne Moor" (Entom. xiv. 181), for *A. circellata*, read *A. straminata*.—W. PREST; York, Aug., 1881.

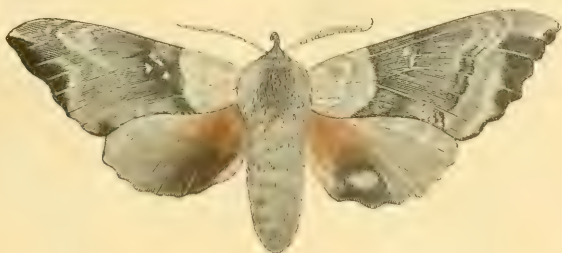
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HYBRID HERMAPHRODITE OF *SMERINTHUS POPULI*.



HYBRID HERMAPHRODITE OF *SMERINTHUS POPULI*.

THE ordinary hybrids between *Smerinthus ocellatus* and *S. populi* are not uncommon in collections, and occasionally one meets with hermaphrodite *S. populi*; but this is the only specimen of an hermaphrodite hybrid *ocellatus-populi* that I am aware of. I wish that I could give some information as to its history.

The specimen was purchased by me at the recent sale at Stevens' sale-rooms of the residue of Mr. Edwin Birchall's collection, on the 19th July last; but as Mr. Birchall has failed to give any details of the origin of the specimen, I cannot say from what source it came, or whether it was captured or bred; but from its condition, and from the fact that, so far as I know, no captured hybrid *ocellatus-populi* has ever been recorded, there can be but little doubt of its being bred.

C. A. BRIGGS.

55, Lincoln's Inn Fields, September 15, 1881.

NOTES ON THE LEPIDOPTERA OF THE OUTER
HEBRIDES.

BY J. JENNER WEIR, F.L.S., F.Z.S.

THE thanks of all entomologists are due to Mr. E. G. Meek for his further additions to our knowledge of the Lepidoptera of the remote islands of Scotland. Mr. Meek has had a collector at Lewis for thirteen weeks during the past season, and he has returned to London with a most interesting series of insular varieties. The collection was made at Stornoway, or within a radius of twenty miles of that port. The collection, although valuable and instructive, is not quite so interesting as that Mr. Meek had from the Shetlands last year.

The Outer Hebrides lie about 2° south of the Shetlands, and 5° further west. The geological formation of the two groups is similar. The bulk of the Shetlands consists of gneiss rocks and granite; nearly the whole of the Outer Hebrides are of the same formation. In the peninsula of Eye, near Stornoway, granite obtains. Both groups are naturally treeless, but extensive plantations have been made near the castle, at Stornoway, and with the imported trees some of the insects captured have been introduced into the district. The Island of Lewis, in which the collection was made, with the exception of the Eye Peninsula adverted to, is a mass of grey gneiss rocks, with poor soil, and large proportions of peat and moor. The peat bogs are covered with *Myrica gale* and an abundance of *Osmunda regalis*.

Upon first examining the Hebridian collection one is struck by the fact that they present no resemblance to the Shetlandic, and that, especially amongst the Geometræ, the prevailing colour is grey.

The Shetlands are far more distant from the mainland of Scotland than the Hebrides. The isolation being greater in the former isles, the differentiation of species into local varieties has been more complete, probably in response to their environment, and also because immigrants from Scotland must be very rare, and a variety once localised would not be interfered with by crossing with the ordinary type. The Hebrides have certainly had the coloration of the Geometræ and other moths, which rest

on the rocks during the daytime, very much affected by the grey colour of the gneiss. Those that most closely assimilated in colour to that of the rock would be less easily perceived by birds, and in the struggle for existence would have the better chance of preservation.

The unmarked species in the following list of fifty-eight captured are of the usual coloration as that which generally prevails in Scotland, and therefore do not call for any further remarks. Those noted with an asterisk present features of peculiar interest, and will be dealt with seriatim.

| | |
|--------------------------------|------------------------------|
| Chortobius Davus. | *Xylophasia rurea and var. |
| Lycæna Alexis. | combusta. |
| Hepialus velleda. | *X. polyodon. |
| *H. humuli. | Apamea basilinea. |
| Chelonia plantaginis. | A. gemina. |
| Odontopera bidentata. | Rusina tenebrosa. |
| *Boarmia repandata var. | Agrostis suffusa. |
| Sodorensium. | A. porphyrea. |
| *Dasydia obfuscata. | Triphæna orbona. |
| Scodiona belgiaria. | T. pronuba. |
| Fidonia atomaria. | Noctua C-nigrum. |
| *Larentia didymata. | N. brunnea. |
| *L. cæsiata. | N. festiva and var. conflua. |
| *Emmelesia albulata and var. | N. baja. |
| Hebudium. | Aplecta occulta. |
| Eupithecia satyrata. | Hadena adusta. |
| E. lariciata. | H. dentina. |
| E. nanata. | H. thalassina. |
| E. vulgata. | Scoparia murana. |
| E. pumilata. | S. angustea. |
| E. n. s. ? in the hands of the | Crambus pratellus. |
| Rev. H. Harpur Crewe. | C. margaritellus. |
| Thera variata. | C. culmellus. |
| *Ypsipetes impluviata. | Tortrix icterana. |
| *Melanippe hastata. | Pardia tripunctana. |
| *M. montanata. | Sericoris urticana. |
| Coremia ferrugata. | Sciaphila penziana. |
| *Camptogramma bilineata. | Phoxopterus unguicana. |
| *Cidaria russata. | Grapholitha campoliana. |
| C. suffumata. | Coccyx hyrciniana. |
| Cymatophora or. | Catoptria ulicetana. |

Hepialus humuli.—The specimens taken of this insect were males only, but they present the ordinary coloration of the species, and show no resemblance to the variety *Hethlandica*.

Xylophasia rurea.—A very fine series was taken, showing a number of intermediate varieties between the type and the variety *Combusta*. It would be impossible to describe the rich chestnut colour of some of these most beautiful specimens, and in many instances the ground colour is in strong contrast to the dark markings.

Xylophasia polyodon.—Probably so fine a series of this insect was never seen. The parallel variety to *Combusta* is of the richest dark chestnut-colour, very glossy, and, as in the case of *X. rurea*, the intermediate varieties are numerous.

Boarmia repandata.—This is one of the two most remarkable insects collected. The response to the environment is as complete as is found to be the case in *Gnophos obscurata*, with this difference, that the latter species frequents rocks, exposed chalk, sand and peat, when at rest, and its colours are assimilated to the prevailing colour of the geological formation. In England *Boarmia repandata* frequents trees when at rest, and its colour assimilates to that of their trunks; but in the Hebrides, where there are naturally no trees to rest upon, the insect has become differentiated to the colour of the gneiss rock, on which it rests in the daytime. Further it appears that this departure from the normal coloration is more pronounced in the female than in the male, the former more needing, in the interest of the race, to be protected. The whole of the specimens obtained are of a leaden grey colour, varied more or less with darker markings; in the females there is no trace of brown, and only by closely examining some of the males can a very faint trace be occasionally discovered; in fact the variety is as grey as *Tephrosia consonaria*, which it resembles both in colour and size, and being very much less than that of the type *Repandata*. This being a well-defined local variety, differing in colour and size entirely from the type of the species, I propose for it the subspecific name of *Boarmia repandata* variety *Sodorensium*.

Dasydia obfuscata.—The specimens captured are lighter than usual; in fact the females are almost of the same colour as some of the variety *B. Sodorensium*, showing that similar causes have produced like results.

Larentia didymata.—The specimens are dwarf, and present the grey coloration of the two species above mentioned, especially in the female.

L. cæsiata.—Another species of the prevailing grey colour of the Hebridean Geometræ; but as grey is the normal colour the differentiation is not very marked.

Emmelesia albulata.—None of the specimens resemble those captured last year in the Shetlands, but the insect occurs in the neighbourhood of Stornoway in two widely different forms; first there is the ordinary coloration, which is quite indistinguishable from that of Scotch and English specimens. A pure white variety has been taken in the proportion of about one to six of the normal form. I have never before seen an albino of a Geometer, except one that I possess myself of *Eubolia bipunctaria*; but this, which I took at Lewes, Sussex, is a mere accidental aberration. In the case of the purely white specimens of *E. albulata*, as several were taken, it is clearly a well-defined local variety, if it be not a species, for no intermediate varieties were found. I propose, therefore, that this variety should receive the subspecific name of *Emmelesia albulata*, variety *Hebudium*.

Ypsipetes impluviata.—The specimens are of an almost uniform grey colour, with the central light band found in the Southern form obscured, another instance probably of an insect assimilated in colour to its environment.

Melanippe hastata.—Those taken are much smaller than English specimens, are more strongly marked with black, and in some the upper wings have the ground colour of a very pale yellow.

M. montanata.—The whole of the ground colour of those captured is suffused with grey, and the specimens are far below the usual size, but they do not resemble those from the Shetlands in the breaking up of the central band into bandlets.

Camptogramma bilineata.—The specimens do not quite resemble those from Shetland, but differ in colour very much from the normal form; the primary wings, though not strictly grey, have the appearance of being washed with that colour, and contrast with the yellow of the secondaries; moreover, in all cases but one, the central band is broadly edged with black; the one aberrant variety is entirely clay-coloured, with the markings unusually faint.

Cidaria russata.—This variable insect is remarkably uniform in coloration in the Hebrides; many scores have been brought by the collector, but the variation amongst them is slight. Grey and black are the prevailing colours, and the usual red markings are but very faintly shown. All the specimens too are dwarfed. There is often seen amongst English examples of *C. russata* many more varieties from the eggs of one female, than the whole of the specimens from Lewis exhibited. I regard this as one of the most remarkable instances of a variable insect becoming uniformly of the colour of the rocks on which it rests.

Mr. Meek's laudable enterprizes of sending collectors to Ireland, Scotland, the Isle of Man, the Outer Hebrides, and the Shetlands have given an impulse to the study of local variations amongst the Lepidoptera of those localities. Far more interest attaches to such varieties than to mere aberrations, which may never be repeated, and are simply monstrous. Collections should be arranged to keep the specimens obtained from different districts distinct, so that where insects are affected by the geological condition of their surroundings it should be clearly shown.

There is another even still more interesting line of research in the collecting of insects obtained from the more northern parts of these islands, which may be put in a concrete form by taking *Cidaria russata* as an example. This insect is double-brooded in the South of England, but it is probably single-brooded only in the Hebrides. Now we find, in the genus *Ephyra*, that the two seasonal broods of some of the species differ materially in colour, but I am not aware that any one has pointed out any difference between the two broods of *C. russata*. If such a difference does exist, which form do the Hebridean insects most resemble?

In the case of *Pieris napi* the two broods differ very much in colour. I do not know how far the insect is found north, but apparently it is not an inhabitant of the Shetlands, nor Outer Hebrides; it is important to know whether there is any part of Scotland where it is single-brooded only, and whether, when this is the case, the specimens approach in colour to the alpine variety *P. bryoniæ*.

I am afraid our common insects are not sufficiently studied; *Pieris napi*, as Dr. Weisman has shown, is well worthy of

attention. I should myself be very glad to obtain Scotch specimens of the insect, particularly of those captured in the mountains. If local variations and seasonal dimorphism were better shown in our cabinets, many drawers of common insects now passed over as hardly worthy of notice would, on the contrary, be deemed the most interesting and instructive part of the collections.

6, Haddo Villas, Blackheath, S.E., September 6, 1881.

SCOPARIA CONSPICUALIS, HODGK.: A LEPIDOPTERON
NEW TO THE BRITISH FAUNA.

BY J. B. HODGKINSON.

SOME ten years ago I took a specimen of this handsome species, when Mr. C. S. Gregson was with me, at Windermere. At the time I observed its peculiar light appearance when on the wing, which readily distinguishes it from any *Scoparia* but *S. pallida*. This may be easily understood by laying a specimen on its back. The under side is all alike, of a creamy satiny spotless white.

This season I have taken a nice series, and all that I have seen of the insect induces me to believe in its being a good species. I now, therefore, propose to describe it under the name of *Scoparia conspicularis*:—

Expanse of wings, male and female, 8 to 9 lines. Palpi light above, dark beneath. Tongue yellow; a conspicuous object. Eyes large, dark; head silvery grey; antennæ steel-grey, short; thorax and abdomen silvery grey. On anterior wings the first space with two basal lines, the lower line longest; the whole space silvery grey, very quaintly irrorated when examined under a low power; first line slightly circular; the orbicular stigmata oval, filled up with very faint ochreous; the claviform stigmata often linear or arched, and attached to the first line, often running well into the fold; the second space dark grey, irrorated with darker, and having well-pronounced marks on the costa above the reniform stigmata. This stigma varies in form: often it is K- or B-shaped, rarely 8; the B wanting part of top and bottom reads like 13. The second line commences with a rich dark grey patch below the costa pointing outwards, then inward to a little beyond

the line which runs sinuously across the wing towards the base of the third space; bright light silvery grey, having very light faint irrorated patches, darkest near the margin, which has two rows of well-defined streaks (not dots) at the inner edge of the cilia, which is light coloured and long. Hind wings light silvery grey. General form rather broad. This species is intermediate between *S. ingrattella*, Zell., and *S. atomalis*, Dbl. It sits triangularly, and may be known from any other of the genus when at rest by the peculiarly distinct light first space, standing out as a white dot on the tree the insect is resting on. Imago appears July and August.

Spring Bank, Preston, August 26, 1881.

[A figure of this species will be given in the November, or an early, 'Entomologist,' in a plate with other new British Lepidoptera.—ED.]

ENTOMOLOGICAL NOTES, CAPTURES, &c.

VARIETIES OF ARGYNNIS PAPHIA IN THE NEW FOREST.—Having just returned from the New Forest, I think it may be of some interest to the readers of the 'Entomologist' to record some varieties of *Argynnis Paphia* which I had the fortune to take. The variety *Valezina* was common, but very few in good condition. I was very anxious to take this variety *in copulâ*, in order to see if there was a corresponding variety of the male; but although the ordinary type of *A. Paphia* were to be seen in great numbers coupled, yet I did not even see a male following *Valezina*. Is this variety sterile? Secondly, a variety of the male:—The upper surface like the type, but on the lower surface the silver streak nearest the base is a mere spot, and the next silver streak is entirely absent. The third variety was of the male:—The markings are typical, except that each wing has a pale straw-coloured patch; that on the fore wing occupies a space immediately behind the third black spot in the second submarginal row, and reaches onwards between the nervures to the next black spot; on the hind wing the pale spot occupies a space between the fifth gibbous spot and the median black line, enclosing the fourth round spot; the pale spots are visible on the under surface, but are not so distinct as on the upper.—H. H. CORBETT; Ravenoak, Cheadle Hulme, Stockport, August 17, 1881.

LYCÆNA ADONIS IN SCOTLAND.—A specimen of this beautiful insect was taken last July by a boy, in a marshy place near a wood, a few miles from Oban. Being doubtful as to its identity, from its extreme northerly locality, it was taken to Mr. Prest, of York, who specified it. As this species is mentioned in Newman as “unknown to Scotland,” and in Morris as only occurring “in some parts of Suffolk and other southern counties,” it will be interesting to know whether it has since been found as far north.—L. STURGE; 20, Bootham, York, August 26, 1881.

VANESSA ANTIOPA.—A specimen of this butterfly was observed at rest, but out of reach, on a willow-tree, on the last Sunday in August, between Tottenham and Ponder's End. This specimen was seen near the place where one was captured last year, as recorded in the ‘Entomologist’ (vol. xiii., p. 240).—THOMAS EEDLE; 40, Goldsmith's Row, Hackney Road, E.

SPHINX CONVULVULI AT BURTON-ON-TRENT.—I have the pleasure of recording the capture, in the midst of this busy town, of two specimens of *S. convulvuli*. The first was taken by Mr. T. R. Hallam, a young collector, in his father's garden, at 23, High Street, on the 25th of last month, at rest on an iron gate. The second was found on September 10th by a labourer while cleaning out a spout in Cross Street, and brought to another of our young collectors, Miss M. E. Day. The first specimen is in fair condition; the second a good deal rubbed, as might be expected from the locality in which it was found.—[Rev.] CHAS. F. THORNEWILL; Burton-on-Trent, September 13, 1881.

SPHINX CONVULVULI AT NOTTING HILL.—This evening, whilst in a shop at Notting Hill, a carter brought in a fine female specimen of *Sphinx convulvuli* which he had found at rest on his cart in the morning. I am keeping the insect alive in the hope of securing eggs. Any hints will be very acceptable.—THOS. HUMBLE RALFE; Bayswater, September, 1881.

SPHINX CONVULVULI NEAR YORK.—On September 9th a fine fresh specimen of *Sphinx convulvuli* was captured on some clothes hanging to dry in this city, and brought to me alive.—C. T. LONGLEY; 19, Lower Eldon Street, York, September 18, 1881.

CHÆROCAMPA CELERIO.—This evening, about seven o'clock, one of my sisters saw a moth buzzing about some fuchsias. Having missed it on the first stroke of the net, it returned in a

few minutes fluttering over some geraniums, where, by a quick downward stroke, I managed to capture it. To my surprise and delight I found it was a good specimen of *Chærocampa celerio*. It was raining rather hard at the time of capture. I caught it off the same flower-bed from which I took *Lycæna bætica* on September 12th of last year.—HERBERT E. DURHAM; 82, Brook Street, Grosvenor Square, September 11, 1881.

ACHERONTIA ATROPOS IN MANCHESTER.—In the first volume of the 'Zoologist' (p. 31) one capture of a specimen of *Acherontia Atropos*, near Heaton Park, was recorded by Mr. R. S. Edleston. If the insect was rare in 1843 it may be safe to suppose that it is a still more infrequent visitor now. One was, however, caught in Bowker Street, Higher Broughton, on June 19th. I did not see it myself, but there need be no doubt as to the identity of the moth, its captor—Mr. W. R. Credland, sub-librarian of the Manchester Public Library—being quite familiar with the species. It was a small specimen, not more than half the size of one well developed. Members of the Bury Natural History Society have occasionally seen this moth at Manchester, Bury, Bolton, Bradshaw, and Birch, but it is marked in their lists as uncommon.—WM. E. A. AXON; Fern Bank, Higher Broughton, Manchester.

HEPIALUS VELLEDA IN SURREY.—I might mention, in connection with a paragraph in last month's 'Entomologist' (Entom. xiv. 211), that a friend at Holmwood showed me a specimen of *H. vellea* which he took in a lane near Mickleham Downs, Surrey, about the beginning of June.—H. K. HARRIS; 2, Richmond Villas, London Road, Kingston-on-Thames.

BREEDING NOLA CENTONALIS.—I have again succeeded in breeding this delicate and variable species. This year it is much earlier than in 1879, when I first met with it at Deal. In that wet and cold season my first capture was on August 15th, but this year they were nearly over by the 27th of July, and my larvæ commenced spinning up by the 4th of September. The larvæ this year fed up on clover. Evidently seasons much affect this insect. The first specimen I ever took was at Freshwater, Isle of Wight, on July 2nd, 1872, and that a worn female. In the cold season of 1879 I captured a virgin female as late as September 1st. Two months' difference! — W. H. TUGWELL; 3, Lewisham Road, Greenwich, S.E.

DEIOPEIA PULCHELLA.—A fine specimen of *Deiopeia pulchella*, Linn., has just been added to my collection of Lepidoptera. It was taken by Mr. Howard Lacey (of Rylstone, Bournemouth) at Bestwall, near Wareham, several years ago, crawling up a muslin curtain in the drawing-room window. Mr. Lacey, having ceased to collect Lepidoptera, has very kindly enriched my collection with this beautiful and valuable specimen.—Rev. O. P.-CAMBRIDGE; Bloxworth, Dorset, August 26, 1881.

CALLIMORPHA HERA IN SOUTH DEVON.—It may perhaps interest some of your readers to hear that I caught a Jersey tiger (*C. hera*) in the Teignmouth Road, near Dawlish, on August 19th, about four o'clock in the afternoon. The insect, a male, is in good condition, with the exception of a slight tear in the right upper wing.—C. W. HERBERT; 6, Brunswick Place, Dawlish, S. Devon.

ABNORMAL ODONESTIS POTATORIA.—I have just received a specimen of *Odonestis potatoria* from Sheffield, with the wings the colour of the male, and with the antennæ of the female. The body is that of the latter, but not quite so large as an ordinary female.—J. R. WELLMAN; 219, Elm Park, Brixton Rise, Sept. 2, 1881.

PLATYPTERYX SICULA.—Through a persistent search amongst its food-plant since the early part of August, I am glad to say I have been enabled to secure larvæ of this species, which have safely pupated. I have likewise to report a fairly successful result from eggs obtained from moths bred at the end of May last; so perhaps correspondents who have not hitherto received this species from me will take heart at the announcement. I attribute my ill-luck this summer to an undue forcing of the pupæ, which previously I had not attempted, as on examination the moths were found fully developed.—WILLIAM H. GRIGG; 31, Cotham New Road, Bristol, September 17, 1881.

DICRANURA BICUSPIS AND *ACRONYCTA ALNI* IN NORTH STAFFORDSHIRE.—On Saturday, May 28th, I took a fine freshly-emerged *Dicranura bicuspis* off an alder-tree on Chorlton Moss, the same locality where three other specimens have been found in former years. This is, however, the first female that I have seen here, the rest having been all males. Three out of the four are in my cabinet, the fourth having been found (last year only) by my friend the Rev. E. C. Dobree Fox, Vicar of Castle Morton. I have tried to get the larvæ by beating the alders in August, but

have hitherto entirely failed. On Sunday, August 28th, passing along a hedgerow within a couple of hundred yards of this house, my eyes fell upon a nearly full-fed larva of *Acronycta alni* curled up on the surface of a leaf of hawthorn. My sons the following day beat the hedgerow from end to end, but without further result. The larva pupated the same week in a dry piece of the hollow stem of *Heracleum sphondylium*. This makes the twelfth larva of *A. alni* I have had in my possession, all found within three miles of this house. So far they have produced seven imagos, which now adorn my cabinet.—[Rev.] THOS. W. DALTRY; Madeley Vicarage, Newcastle, Staff.

BOLETOBIA FULIGINARIA.—Since informing you of the capture of this insect (Entom. xiv. 212), I am happy to inform you that the other two, which I expected were in the same cellar, have both been captured. One is in the possession of Mr. Bond, and the other I have. Both were females.—FRED. W. SMITH; Hollywood House, Dartmouth Point, Blackheath, Aug. 27, 1881.

BOLETOBIA FULIGINARIA IN LONDON.—I am pleased to inform you that another specimen of *Boletobia fuliginaria* has just been taken (10 o'clock) in our warehouse in Thames Street, this being a female, and owing to its having been out some time is a little worn, but nevertheless a perfect specimen. There is a wide difference between the capture of my first (male) specimen, July 14th, and this one (female), August 25th.—J. R. WELLMAN; 219, Elm Park, Brixton Rise, S.W., August 25, 1881.

EUPITHECIA EXPALLIDATA TWO YEARS IN PUPA.—In September, 1879, I collected about eighty larvæ of *Eupithecia expallidata* from the golden-rod (which abounds here); from these larvæ forty-four of the perfect insects emerged during June, July, and August, 1880, and nineteen in the corresponding months of this year—1881. Were lepidopterists previously aware that a proportion of this insect remained two years in the pupa state?—[Rev.] O. P.-CAMBRIDGE; Bloxworth Rectory, Sept. 10, 1881.

[It is by no means of rare occurrence for pupæ of the genus *Eupithecia* to remain over to the second year. I know of an instance of *E. togata* pupæ producing moths in the third season.—J. T. C.]

COREMIA QUADRIFASCIARIA IN NORFOLK. — I think a few remarks on the occurrence of this local insect in Norfolk will not

be out of place. I have taken the species in many localities in this county, and in the west and north-west of the county it seems to be generally distributed and in some seasons fairly common. This season I have been unfortunate in procuring the insect in good condition, but I have never observed it more plentiful. Indeed, although it may appear strange to some, I found the species, in a locality about eighteen miles from this town, one of the commonest of *Geometræ*; one, and frequently two or three, would start up at nearly every stroke of the beating-stick. As far as I have observed it has a preference for settling on the trunks of various trees, and often have I noticed it leave such situations at the approach of the collector, closely resembling in this respect *Boarmia repandata*. Undoubtedly the best method of collecting *C. quadrifasciaria* during the daytime is to strike the trunks of trees with a stick, and if in the locality where this method is adopted the insect will fly up to shift quarters for similar situations, and can then be netted or marked down again. It is also easily obtained by mothing at dusk, as it then flies freely. I think from what I have stated that Norfolk may be chronicled as amongst the best of localities for this species.—E. A. ATMORE; 8, Union Street, King's Lynn, September 17, 1881.

RANGE OF *COREMIA QUADRIFASCIARIA* IN THE EASTERN COUNTIES.—The occurrence of this species at Danbury, as recorded in the September 'Entomologist' (Entom. xiv. 212), is very interesting to Essex collectors. Would it not, however, be to the advantage of Entomology in general for anyone before publishing similar captures to collect information as to other places in the same district where the species to be noticed has occurred? It seems to me a lamentable lack in entomological literature that there should be no modern work recording the habitats of our rarer species. To read, as we do in Newman, that *C. quadrifasciaria*, for instance, has occurred in Suffolk, is scarcely satisfactory to one's feelings, if one wishes to invade the habitat of the species. Stainton's work was, doubtless, almost perfect when published; but the lapse of a quarter of a century has seen such strides made in Entomology that surely a new edition is called for. Failing this, could you not make it a speciality in the 'Entomologist' to publish from time to time lists of localities for some of our rarer species? It is difficult to conceive a more

interesting point in connection with a species than its range of distribution in a small country like England. Such a knowledge would help us to determine the reasons for the extremely limited range of such an insect as *Acronycta strigosa*, whose food-plant is perhaps more widely distributed in England than any other tree. Now, with regard to the species recorded last month at Danbury, I believe, if records of its occurrence were collected, it would be found to be widely distributed in the Eastern Counties, but extremely local. Personally I have taken it this season at Brandon, and found it some ten years since not uncommonly at Harlow. My friend Mr. W. J. Cross, of Ely, has taken it at Stanstead (Essex) and at Cromer this season. It has also occurred more than once at Madingley, near Cambridge.—GILBERT H. RAYNOR; Hereward Hall, Ely, September 12, 1881.

ACRONYCTA ALNI NEAR LEICESTER.—On August 6th I found in my garden a larva of *Acronycta alni*. It is about an inch and a quarter in length. The larva was taken on a rose tree, on the leaves of which it continues to feed; neither whitethorn nor alder, its assumed food-plants, grow in the garden or near.—W. L. SALUSBURY; 130, London Road, Leicester, Aug. 12, 1881.

ACRONYCTA ALNI NEAR BURTON-ON-TRENT.—I had, on August 29th, 1881, a fine larva of *A. alni* brought me; it was found on elm; it has since spun up in a piece of dried peat, which I put into the cage.—GEORGE BAKER; Alni Villa, Ashby Road, Burton-on-Trent, September 19, 1881.

HECATERA DYSODEA IN NORTHUMBERLAND.—As Newman does not mention Northumberland as one of the counties where *Hecatera dysodea* has been taken, I think it may be worth while to record in the 'Entomologist' that two specimens have been taken at Heaton Hall, Newcastle-upon-Tyne, one last September and one on the 14th of this September, both coming to light.—MRS. ROUTLEDGE; Stone House, Carlisle, September 15, 1881.

AGROTIS OBELISCA IN FIFESHIRE.—Although I have never noticed any mention of *Agrotis obelisca* having been caught in Scotland, I find it abundant in this locality, which is situated at the foot of hills close to the sea, always feeding in company with *Xylophasia polyodon*, and generally in pairs, on the common rag-

wort.—WILFRED W. O. BEVERIDGE; Rockville, North Queensferry, Fifeshire, September 5, 1881.

[In Dr. Buchanan White's 'Lepidoptera of Scotland,' *Agrotis obelisca* is stated to be "very local," and is recorded certainly from the "Forth" district, doubtfully from "Solway," and probably from several other of his divisions (Scot. Nat. ii. 281). In the same journal Sir Thomas Moncreiffe recorded this species as abundant on Moncreiffe Hill, Perth, and adds, "I think it has increased considerably in the last two years" (Scot. Nat. iv. 108; 1877). In Prof. Trail's 'Lepidoptera of the Dee,' we find "*A. obelisca*—once at Old Aberdeen" (Trans. Nat. Hist. Soc. Aberdeen, 1878, p. 36).—E. A. F.]

HELIOTHIS ARMIGERA IN GLOUCESTERSHIRE.—I had the satisfaction of capturing another, though rather weather-beaten, specimen of this Noctua, when at Wotton-under-Edge, on the 2nd of September. I was beating my way through some rough boggy ground on the top of the hills, searching principally for Hymenoptera, about mid-day, when a pale-coloured moth started up in front of me, which I took to be a *Lithosia*. It flew very softly some twenty yards on, and, noting whereabouts, I went on with what I was doing, intending to have another look at it. On my getting nearer I observed it settled on a bent with wings partially expanded and head *downwards* towards the ground, and seeing it was not what I expected I pushed through towards it, but it was off before I could get near enough to net it. It flew now only a very short distance, more in the open, and settled itself exactly in the same position again; I soon had it in my net, and found out what it was. Is it singular for a Noctua to settle head downwards? It was this very circumstance that attracted my attention to it. I might add, although the sun was bright there was a stiffish breeze blowing. Was this the reason; or do Noctuæ sometimes repose thus?—V. R. PERKINS; 20, Gloucester Street, S.W., September 16, 1881.

SCOPARIA CONSPICUALIS, *Hodgk.*, NEAR YORK.—Mr. Prest, of York, lately sent up to me for identification two specimens of a *Scoparia*, which prove to be Mr. Hodgkinson's new species, *S. conspicularis*. They were captured this season near York.—JOHN T. CARRINGTON; Royal Aquarium, S.W., September, 1881.

TORTRICES IN EPPING FOREST.—During the last week in

August I had the pleasure of taking, in one of its old localities, *Peronea cristana* in several varieties. *Semasia spiniana* was flying round the whitethorn-bushes in open glades about five o'clock in the afternoon.—THOMAS EEDLE; 40, Goldsmith's Row, Hackney Road, E.

PERONEA ASPERSANA (*Hübner*) INFESTING THE STRAWBERRY.—During June I received from Blairgowrie, N.B., some larvæ, which my friendly correspondent thought might prove to be that American pest, *Anchylopera comptana*, which has so much discouraged strawberry culture in various localities across the Atlantic. A few of these have developed into moths; and I have to thank Mr. Fitch for the identification of the species, which had not before, so far as I know, been observed upon the strawberry. That plant is, indeed, remarkably free from the attacks of lepidopterous larvæ, though it may appear to be liable to the visits of many that feed upon various species of the Rosaceous order. The food of *P. aspersana* is stated to be usually either *Potentilla*, dropwort (*Spiræa filipendula*), or salad burnet (*Poterium sanguisorba*); but if the increasing culture of the strawberry is likely to attract this species to it, and perhaps increase its numbers, it will turn out rather serious. At Blairgowrie the larvæ were noticed upon the plants in 1880, but they were still more prolific this year, destroying several acres, in spite of attempts to keep them under. The eggs, my correspondent thinks, are laid in the buds, the larvæ feeding during May and June; and he believes there is a second brood in September. The severe remedy of burning the surface has now been tried, and it is probably difficult to suggest anything short of this which would be of utility.—J. R. S. CLIFFORD; 13, Cambrian Grove, Gravesend, Kent, September 11, 1881.

RARE LEPIDOPTERA IN ESSEX.—I am glad to announce the capture of a nice specimen of *Argynnis Lathonia*; it was flying along a road at St. Osyth, and very considerably settled on the mud about a yard in front of me until I adjusted my net, and captured it; this was on September 14th. On the 9th I took a female *Colias Edusa* on the coast near Clacton-on-Sea, and hope to see other captures recorded, if any have been made, as the occurrence of isolated specimens in seasons when the species is scarce is of much more interest than the record of any number

of captures when it is common. Four specimens of *Sphinx convolvuli* have been brought to me of late, but none of them have been fine.—W. H. HARWOOD; 8, West Stockwell Street, Colchester, September 20, 1881.

NOTES FROM RANWORTH FEN.—On August 15th I sugared, with my brother, in Ranworth Fen. The heavy and almost continuous rains of the week before had left the marshes in anything but a pleasant state for working, water lying everywhere, under the grass and sedges, three or four inches deep, and in many places forming large pools much deeper. We sugared the stems and leaves of some alder bushes, but our efforts were only rewarded by the appearance of one species, *Apamea fibrosa*; this was abundant enough, and we had taken twenty-five specimens, when an unlucky slip into a pool put a stop to sugaring for me that night. Besides the *A. fibrosa* we saw nothing but one *Plusia festuæ* and a couple of the ubiquitous *Triphaena pronuba*. The next day was dull and cloudy. We tried beating, and took on the marsh *Cidaria testata*, *Acidalia immutata*, *Phibalapteryx lignata*, *Crambus selasellus*, and *C. uliginosellus*. In the alder carrs we got *Epione apiciaria*. All the Geometers we saw were much faded and weather-worn. In the afternoon the sun came out for about a quarter of an hour, and with the sun appeared *Papilio Machaon*. We netted a couple, and saw two or three more; and afterwards my brother took another at rest on a reed. At dusk we netted *Nonagria fulva* and *N. despecta*, but the latter insect was going off in condition. We sugared that night in the very core of the fen, between two reed beds. We stopped till midnight, but took nothing except four *A. fibrosa*, *T. pronuba* always excepted. I was a good deal surprised to find this latter insect turning up so deeply into the fen. Up to August 8th, when the fine weather ultimately broke up in this neighbourhood, the past season had been a good one for entomologists, as it was generally in the Broads district. *P. Machaon* has abounded. One collector showed me a box containing fifteen dozen pupæ, taken in little more than a week. One imago which he bred remained, he declared, less than twenty-four hours in the pupal state. The same man showed me a board on which were set nine specimens of *Nonagria brevilinea*, some in fine condition; also a few *N. canneæ*.—C. CANDLER; Harleston, Norfolk, September 1, 1881.

DOES FOOD PRODUCE VARIATION?—In the remarks that Mr. Butler makes touching Mr. White's paper (Entom. p. 173) he says, "I do not admit Mr. White's statement that food does not produce variation," and then instances Mr. Herbert Goss's experiments in the rearing of *Odonestis potatoaria*. This year I have reared a quantity of *O. potatoaria*, and, from my botanical ignorance of the grasses they fed upon, I have given to them the grass that was most handy—sometimes it came from Kent, sometimes from Hampshire, more often from the London parks, miles from where the larvæ originally came from. In no single instance have I succeeded in obtaining a departure from the normal type either in size or colour. Having made in rearing of larvæ the changing of food-plants a speciality, hoping thus to get varieties, I am enabled to speak with confidence on this subject. If the food-plant be chemically treated, or the larvæ be kept in other than natural conditions, then variable forms and colours may be expected, and dwarfs in size especially. This year I have had feeding between three and four hundred larvæ of *Arctia caja*; some idea of their number may be inferred from the fact of their devouring in ten hours a large cabbage and two lettuces. These larvæ were the majority of them taken at Willesden, from off the nettle and a bushy kind of shrub which the country people call the "snow-berry." They were reared on dock, dandelion, plantain, nettle, sallow, whitethorn, blackthorn, oak, and a host of other food-plants far too numerous to mention. The food was changed daily, and always differed from that of the previous day, yet in no case as yet has even a noticeable variety come out. Some months back, conversing with Mr. Bond on this subject, he remarked that some years ago a friend and himself had about five hundred larvæ feeding on various food-plants, with the hope of getting a variety, with the same results as myself. Thus far my experience is conclusively in favour of the theory advanced by Mr. White.—THOS. HUMBLE RALFE.

AN ENTOMOLOGICAL EVENING AT THE ROYAL AQUARIUM.—After having been cut off from all intercourse with entomologists for several months, it was a great pleasure to me to drop into the Royal Aquarium, Westminster, on Monday evening last, September 5th, and meet so many entomological friends, and to delight my eyes by looking on the beauties which had been captured during the season, and were then exhibited in a

galaxy of lepidopterous stars. The first box peeped into was shown by Mr. Farn: in it were some fine varieties of *Tephrosia biundularia*, a black *T. crepuscularia* from Wales; a series each of *Lycæna Corydon* and *L. Adonis*, showing interesting variations of under sides; a beautifully-marked variety of *Abraaxas grossulariata*, also three curious Tortrices, the specific identification of which did not appear to be clearly established; one of these seemed to be a variety of *Spilonota lariciana*. Mr. Elisha showed a box of bred Tineina, among which were *Colcophora alcyonipennella*, *C. vibicella*, *C. conspicuella*, *Nemotois scabiosella* and *N. Schiffermillerella*, *Laverna Raschkiella*, *Gelechia maculella*, *Gracilaria semifasciella*; in this box were also examples of *Platypteryx sicula* and *Pterophorus microdactylus*. Mr. Machin exhibited a fine series of bred *Pteroxia caudella*; and Mr. Pratt examples of *Ephippiphora tetragonana*, *E. obscurana*, *Eupæcilia griseana*, *E. implicitana*, and others. Three fine specimens of *Boletobia fuliginaria* were shown, one a female, by Mr. T. Williams, and a male and female by Mr. Wellman. This gentleman also exhibited a series of bred *Arctia fuliginosa*, each example showing some slight variation of hind wings; also some very beautiful varieties of *Venusia cambricaria*. Mr. Brown's box contained, among other insects of lesser interest, two fine *Acronycta alni* and a specimen of *Catocala fraxini* bred from foreign eggs; the blue band of the hind wings seemed of a paler shade than in veritable British specimens. Mr. Graham showed a specimen of the dark form of *Limenitis Sibylla*. The new "pug," *Eupithecia jasioncata* (Crewe), *Nyctegretes achatinella*, *Penthina postrema*, *Coccyx pygmeana*, *Eupæcilia ambiguana*, *E. flaviciliana*, *Pterophorus lætus* and *P. Zetterstedtii* were shown by Mr. Meek; also a case of insects from the Hebrides, among which were some curious forms of various species,—*Boarmia repandata* of a stone-grey colour, *Emmelesia albulata* quite white and without markings, *Camptogramma bilineata* much suffused with black, *Xylophasia rurea*, examples of the var. *Borealis*, besides some nearly black forms. Mr. Carrington exhibited a new *Scoparia*, lent by Mr. Hodgkinson, of Preston, and named *Scoparia conspicualis*; also some fine varieties of *Boarmia repandata*, one of which was especially beautiful; an example of *Argynnis paphia* of ordinary markings, but with a whitish blotch of irregular shape near the centre of each wing; extraordinary varieties of *Cosmia trapezina* of an

orange colour; a dark variety of *Cleora glabraria*; a curious aberration of *Venilia maculata*, on the right posterior wing of which was a blackish dash extending from the base to the middle of hind margin; and a banded variety of *Amphidasis betularia*; besides which were several other rare species. Mr. Eedle showed a box containing *Meliana flammea*, *Nonagria Hellmanni*, and *N. arundineta*; and Mr. Wailly, a fine box of *Papilio Philanor*, *Sphinx quinquemaculata*, &c., and several silk-producing Bombyces, with their cocoons; and living larvæ of *Ceratocampa imperialis* were shown by Mr. Wailly, as well as other larvæ of rare exotic species, all of which had been reared in Mr. Wailly's garden; these included the American *Orgyia leucostigma*, first reared in this country; also fine cocoons of *Attacus Cynthia*, *A. Pernyi*, and those of a new hybrid between *A. Roylei* and *A. Pernyi*. In my own exhibition box were examples of *Toxocampa cruceæ*; banded varieties of *Boarmia repandata*; one specimen of an *Eupithecia*, probably new; a *Dicrorampha* new to Great Britain; and one not identical with, but closely allied to, *D. alpina*; also a "plume," probably new. There were many other boxes of insects shown; but memory and space precludes further mention of them. To the kindness of Mr. John T. Carrington is due the origin and success of these monthly meetings. In May, 1878, the now familiar invitation first appeared on the cover of the 'Entomologist,' and but few "first Mondays in the month" have passed since that time without a goodly gathering of entomologists at the Aquarium, varying from twelve to forty-five in number; neither has there been an evening without interesting exhibits of insects and discussion.—RICHARD SOUTH; 12, Abbey Gardens, N.W.

PHÆDON BETULÆ (*Sharp's Cat.*).—Observing Mr. Hart's enquiry respecting the food-plant of *Phædon betulæ* (*Entom.* xiv. 187), I was surprised to find that in reply to his query it was spoken of as being generally abundant in watery places. I am not for one moment going to dispute such authorities as my friends Mr. Fitch and Dr. Power; but as my experience of this Coleopteron is quite contrary to the aforesaid gentlemen, it may not be uninteresting to give it:—*Phædon betulæ* is one of the greatest insect pests the market gardeners around London have to contend with. Having grown horseradish for some twenty years for the London markets, it has been my lot, unfortunately, to have my attention frequently called to this pest, particularly in hot dry seasons: it

attacks the leaves of the horseradish when about eight or ten inches in height, and if not speedily destroyed it will in a very short time sweep over a large tract of land, leaving nothing of the leaf, but the stalk standing upright, and looking like a dried-up lot of sticks, the result being that the plant becomes weakened and gradually dies, and this on land where there is no water near, unless, indeed, in the drain-pipes underneath the surface. I have seen the leaves literally black with this obnoxious insect; and as gas lime, slacked lime, soot, salt, and many other special fertilisers do not seem to make any impression on it, the only remedy appears to be fire; at least this is my experience, having during that time had to burn some acres of land to get rid of the pest. In the year 1878, on about two acres of land at West Ham, which we had to burn, it was accompanied by *Thyamis ochroleuca*, Marsh, in almost as great abundance as the *Phædon* itself. It is also very destructive to radishes when in the seed-leaf, clearing the ground as it goes, unless the weather happens to be very showery, and thus helping the plant into the rough leaf, in which state it seems to defy its enemies. I should say this appears to be the small form, and I think less likely to be found near water than the species with callosities Dr. Power speaks of. I do not find mention of this insect in Miss Ormerod's valuable 'Manual of Injurious Insects;' this is the more remarkable, as she has given so great attention to insects more particularly injurious to agriculturists.—T. R. BILLUPS; 4, Swiss Villas, Coplestone Road, Peckham.

[If Mr. Billups will refer to the article in the 'Entomologist' (Entom. xiv. 187), we think he will find that there is no real discrepancy between his own account and the statement of Mr. Fitch and Dr. Power; but the difficulty seems to lie in a misapprehension of the synonymy as there stated. *Phædon betulæ* of Sharp's Cat. is NOT the insect Mr. Billups alludes to, but is the larger one with callosities on the shoulders, called *P. armoraciæ* in Wat. Cat., and stated to be less common, but perhaps more aquatic. The species which Mr. Billups means to speak of is the small round one, the *P. betulæ* of Wat. Cat., but called by Dr. Sharp *P. cochleariæ*, and which, in the article alluded to, is stated to be "more common, less aquatic, and to have been seen utterly destroying a crop of horseradish in a garden;" agreeing *entirely* with what Mr. Billups says.—ED.]

CAPTURES OF ACULEATE HYMENOPTERA.—At the commencement of July I took a male of *Crabro scutellatus* (= *pterotus*) on Wimbledon Common, at the back of the running deer butt. On August 1st I captured a splendid female of *Hoplissus* (*Gorytes*) *bicinctus* in the neighbourhood of this city. Aculeates have been scarcer than ever this season, at least in my neighbourhood. As a specimen I give the result of my last three half-days' observations, excluding wasps and Bombs: I saw one male *Cilissa tricineta*, two males and one female of *Andrena dorsata*, perhaps half a dozen small *Halicti*, one male *Megachile centuncularis*, the above-mentioned *Hoplissus*, and a female of *Crabro cribrarius*. This is by no means exceptional, for the same paucity of aculeate Hymenoptera has prevailed throughout the whole season for the last three or four years; each succeeding year has been worse than the previous one.—JOHN B. BRIDGMAN; Norwich.

SCARCITY OF ACULEATE HYMENOPTERA ROUND LONDON.—Having been out on several occasions in various parts of Surrey and Kent in search of aculeate Hymenoptera, and meeting with hardly any success, although the places visited are celebrated localities for these insects, I should be very glad to hear that other collectors have been more fortunate. My own opinion is, that the late severe winter and cold spring have told very much upon the *Andrenidæ* especially. With the exception of taking a very few at Sevenoaks at Easter, I have hardly found any. Bombs, on the other hand, have been rather plentiful. Other aculeates have, like the solitary bees, hardly put in an appearance, notwithstanding the tropical heat we have lately endured. Sawflies, too, seem very restricted in numbers. I hope others can give a better report from other localities, which it would be interesting to have in an early number of the 'Entomologist.'—V. R. PERKINS; 54, Gloucester Street, S.W., July 22, 1881.

GREAT SCARCITY OF WASPS IN KIRKCUDBRIGHTSHIRE.—Last year, as I recorded at the time (Entom. xiii. 223), this county had to endure a veritable plague of wasps. The winter of 1880-81 was exceptionally severe here, as elsewhere throughout Britain, and the spring was very cold and protracted. Excessively hot weather, for the period of the year, commenced about May 8th, and continued till the end of the month. During this time the large female wasps—almost all *Vespa vulgaris* and *V. germanica*—

came forth from their winter quarters in extraordinary numbers. Along the hedge-sides, and in the woods and plantations, they were as plentiful as ever I saw the workers on a hot August day. The most serious alarm prevailed amongst gardeners, bee-keepers, and all whose "crops" were likely to be affected by the plague of wasps which seemed inevitable, and paragraphs on the subject appeared in the local newspapers. There seemed every reason to fear that the wasps would be a hundredfold more numerous than in 1880; but simultaneously with the advent of the cold wet weather that set in about June 2nd, and has continued since without intermission in this district, the wasps disappeared; and since then I do not believe I have seen a total of fifty examples. What was the reason of this disappearance? I scarcely think this can be wholly attributed to the cold wet weather, but undoubtedly that was the chief cause. I am of opinion that many of the female wasps were barren, and never commenced to form nests. The summers of 1877 and 1879 were wet and sunless, and there were almost no wasps; while the summers of 1878 and 1880 were very fine seasons, and wasps were exceptionally numerous.—ROBERT SERVICE; Maxwelltown, Dumfries, August 16, 1881.

FORFICULIDÆ.—Those species which compose this little group of insects are placed by some naturalists under the order Orthoptera, while others consider that they possess such distinctive features as to render them of sufficient importance to form a separate order, and have thus termed them the Euplexoptera. Whether they are entitled to this position in Science it is not my object now to discuss; but, as these insects are this season so extraordinarily abundant in our neighbourhood as to cause them to be quite a pest, perhaps a short account of their doings may be of interest to some of the readers of the 'Entomologist.' Their fondness for dahlias is well known to every horticulturist, and therefore it is not surprising that they have this summer vigorously attacked these plants. In one bed our "traps" daily yield large quantities, and still they come as numerous as ever, devouring the buds long before the flowers are visible, thus effectually destroying the object of the gardener. They have also taken possession of some picotees, where some may be found in every flower. The entomologist at night finds them a source of much annoyance. Sugaring some trees in our garden, a distance of 12 feet apart for a length of 100 yards, we

find on every patch of sugar a score or two revelling upon the sweets; nor do they stop there, but even ascend the street-lamps; and so, when adopting this mode of collecting, one is certain to net more earwigs than moths. They also intrude in our dwellings, where woe be to the entomologist who leaves his setting-house within their reach, as they seem to possess a great liking for his specimens. Unfortunately I can give testimony upon this point; after entering the house the *modus operandi* is to pass along each setting-board, and to cut off all the antennæ without otherwise injuring the insects; on one occasion in two days a single earwig removed thirty-six pairs belonging to *Diloba cæruleocephala*, while about a dozen other sorts that were upon the same boards remained untouched. This season one again managed to elude my vigilance, but happily was detected before doing much mischief, the choice this time being some rows of bred *N. dictæa*. —H. T. DOBSON, JUN.; New Malden, Surrey.

UNITED FIELD NATURALIST'S SOCIETY. — A numerous meeting of this Society was held on Sunday, September 11th, at Middleton, near Manchester. After several interesting discussions on botanical, ornithological, geological, and other subjects, the meeting adjourned for luncheon. On reassembling Mr. J. Thorpe, of Middleton, read a long and carefully prepared discourse upon "Insects injurious to plant-life." He divided his subject into sections: such as foliage feeders, insects detrimental to fruit, ornamental flowers, wood-borers, &c. After enumerating a large number of insects looked upon by man as his enemies, Mr. Thorpe explained some of his experiments with Nature's natural check upon these creatures, *viz.*, the ichneumons. A long discussion followed upon the points raised by the essayist, and a cordial vote of thanks was passed to Mr. Commissioner Thorpe for his paper. We need not point out the advantage of these periodical gatherings of naturalists in our great manufacturing centres, nor to the elevating influence they have upon many who would otherwise take little interest in matters scientific. —ED.

ERRATUM.—In the editorial note on *Boletobia fuliginaria*, p. 212, for "species" read "specimen." P. 196, l. 7, for "inches" read "lines."

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URANIA SLOANUS AT HOME.

BY P. H. GOSSE, F.R.S.

NO. II.—THE LARVA AND PUPA.

IN the 'Entomologist' for June, 1880, appeared some pictures of one of the most elegantly-formed and most richly-coloured of exotic Lepidoptera. From the same careful observers I can now describe the transformations of this fine insect, which, though it is a denizen of one of the oldest British colonies, have to this time remained unknown.

My friend, the Rev. J. L. Mais, had written to me as follows, from Walton, Jamaica, under date of July 6th, 1880:—"We are now highly interested in watching some curious larvæ, which we have reason to believe are those of *Urania Sloanus*. They were found at a spot near the coast, which a week ago was swarming with *Uranie*, all in much battered condition. The caterpillars suspend themselves in the air by a long silken thread, having the power to descend, hereby, from trees forty or fifty feet high, to the ground; and back again, when disturbed.

"The larvæ, when ready for change into the pupa-stage, weave a silken net, including therein gnawed fragments of the leaves they have been feeding on, and pellets of their own fæces.

"We cannot be sure that we have lighted on the larva of *Urania*, but it seems probable. The imago is in multitudes here at present; and generally in perfect condition. In some places they hang on the branches three or four feet from the ground, like swarms of bees!"

A fortnight later my friend thus wrote:—"All doubt on the

subject has been dispelled. This morning came into being the first *Urania Sloanus* that has been reared from the larva. It assumed the pupa form on the 7th instant, having been fed on the leaves of what we know as the wild walnut." My correspondent, with excusable pride and enthusiasm, enters into many minute details of the appearance of his new-born treasure, and of his manipulation of it. These, though interesting, I will not repeat; but rather quote some further observations made on the larvæ in a state of freedom.

"On the 12th [of July, 1880] my son and I rode down to Bogue Bay, near Ocho Rios. It is a pretty little bay, wooded to the water's edge; the trees, in many instances hanging over the beach. From some branches we saw several of these black and white caterpillars, letting themselves down by a single silken thread, *until they touched the salt water*. There they would remain a few seconds, enjoying their sea-bath, and then they would haul themselves up again to the leaf they had selected as their temporary home. If touched, they would let out the thread with great rapidity.

"On closer inspection we observed some trees,—known by the fishermen around as the wild walnut,—with large almond-shaped leaves, covered with these caterpillars, of different sizes, all feeding greedily. Many of the trees had been denuded to the very leaf-stalks, and then forsaken by the larvæ for fresh food.

"It was curious and interesting to notice how these hairy caterpillars abounded. Some were crawling on the sand; some floating in the sea, at the mercy of the tiny wavelets that broke upon the shore. All, however, seemed quite happy, and at home, whether on land or sea. These fortunate creatures appeared to us to have no enemies. A fisherman close by told me that what we saw was nothing to the number he had seen two days previously. The trees, he said, were black with them; and he added that, every year, about the same time in July, these caterpillars are found wherever the wild walnut grows. I may add that, four days later,—on the 16th,—we revisited the spot, but not a trace of larvæ or pupæ was to be found!"

My correspondent kindly sent to me the empty puparium within its loose cocoon, affixed to the surface of a broad, ovate, leathery leaf, and several larvæ of different sizes, preserved in alcohol. He also inclosed a perfect leaf, of what he calls the

wild walnut. I had supposed that this would prove the *Picrodendron juglans* of Grisebach; but Sir Joseph D. Hooker assures me that it is not that species. The material was in fact insufficient for determination, which had to be deferred till another season should enable my friend to remit me a specimen with flower and germen. This he has now done with more larvæ and pupæ; and the plant proves, on the same high authority, to be no other than the euphorbiaceous cob-nut, *Omphalea triandra*, which Mr. Macleay gives as the food of the allied *Urania Fernandina* in Cuba; a tree whose polymorphic leaves may well excuse the fisherman's mistake.

I have now but to add careful descriptions of—

THE LARVA AND PUPA OF URANIA SLOANUS.

Of the LARVA the general figure is that common to many caterpillars, especially among the Bombyces and Noctuæ, the segments nearly cylindric, and equal in thickness throughout; carrying four pairs of prolegs, besides the anal pair. The head is smaller (but not conspicuously) than the first thoracic segment, from which it protrudes without the intervention of any neck, such as that common in Hesperidan larvæ: it is marked from occiput to lip by an indentation. Its colour is uniformly a reddish fulvous; smooth; each cheek carrying six simple ocelli, arranged thus: five in a bow, of which the central three are larger than the rest, and one on the cord of the bow.

The body is black, with a rather broad band running down on each side of the middle through the entire length. This band consists of two lines of white, somewhat irregular and interrupted, joined by numerous cross lines still more irregular. The effect produced is as if two lines of Hebrew, the modern square character, had been written in white paint all down the black back. The median line, which, in my examples in alcohol, is as black as the rest of the ground-colour, is described by Mr. Mais as blue in the living larva. Down each side, including the spiracles, is a single slender white line, much interrupted. The ventral surface is black, bounded on each side by a broad band of yellowish white, which includes the fulvous legs, and the white prolegs. Each segment appears to carry a whorl of long, very slender, fusiform hairs, black for their basal half, white for their terminal. These are probably deciduous; since in the

younger examples they are the more numerous; few and sparse and inconspicuous, however, at best. Length of larva about 1.75 inch; thickness 0.25 inch; when full-grown.

The PUPA, in general outline, can scarcely be distinguished from that of an ordinary *Noctua*; each abdominal segment bears a whorl of minute blunt points; the anterior wing-covers alone are visible; on these all the nervules are traced in black, on the red-brown hue which else is general; surface polished. I observe that a silken thread, attached to the anal point, floats to some distance (half an inch or more) in the preserving fluid. This thread readily catches any object as a pin or stick, and is so tenacious that the pupa can be pulled out and suspended in the air by it alone. Length 0.85 inch; greatest width 0.27 inch.

Between these larvæ and pupæ of *U. Sloanus*, and those of *U. Fernandinae*, described and figured by Macleay (Tr. Zool. Soc. i. p. 186, pl. 26), there is considerable diversity. The former, though of like length, is much more slender; the red hue of the head is more uniform, and much duller; and, though the black and white of the body vary much, in relative proportion, in individuals, yet the black decidedly preponderates; in many examples to the almost total evanescence of the white; and thus the contrast of the prothoracic with the following segments is much less conspicuous. The pupa is of a deep chestnut hue; and the wing-cover does not sensibly project from the general outline, as it does in Macleay's figure.

The outline of the pupa well agrees with that of *Corinidia* (?) *Orithea* figured by Prof. Westwood (Tr. Zool. Soc. x. pl. 85, fig. 2); save that its thickness from back to breast is proportionally less; the facial parts are less prominent; there is no deflexion of the terminal segment; no spine; and the tongue-case is not lengthened beyond the wing-cases.

The figure of the larva (Ibid. fig. 1) very well agrees in outline with *U. Sloanus*; if we double the dimensions of the head and prothorax, and omit the spines and tubercles of the body.*

* Sganzin's description of the larva of *Rhipheus* will by no means serve for *Sloanus*. The body is certainly not stouter in the middle; but, as nearly as may be, equally thick throughout. I recognise a certain likeness to a Geometric caterpillar, though, as he notes, the prolegs are fully developed.

There is no striking likeness to the plump downy caterpillar of *Pygæra bucephala*. Save for the sparsely scattered hairs the surface, carefully examined with a powerful lens (in spirit), appears perfectly smooth.

Sandhurst, Torquay, October, 1881.

ON SILK-PRODUCING AND OTHER EXOTIC BOMBYCES REARED IN LONDON IN 1881.

BY ALFRED WAILLY.

(Membre-Lauréat de la Société d'Acclimatation de France.)

AGAIN I have to complain of the weather. During the month of July, when the weather was magnificent, I had the largest number of larvæ I ever possessed: the trees in my garden were literally covered with them, and I had others on branches with stems in water. At the end of July larvæ of several species had nearly reached their last stage, and I expected a fine crop of cocoons. Then came August, with its tremendously heavy, incessant and cold rains, which lasted for several weeks, and destroyed all the good work done by June and July. Very few larvæ could resist the atrocious weather of August, 1881.

For the first time I reared *Actias Selene*, from India, in the open air on a nut tree, till the larvæ reached their last stage. On the same nut tree were reared larvæ of *Telea Polyphemus*, *Samia Cecropia*, from America, and hybrids obtained by the crossing of *S. Gloveri* (female) with *S. Cecropia* (male), and *Cecropia* (female) with *Gloveri* (male).

Samia Gloveri, from Utah, was reared during the first four stages in the open air on a wild plum tree; then on branches of *Salix caprea*. Several other species were reared in the open air, of which I shall mention *Attacus Atlas*, which I reared, or rather attempted to rear, on the *Ailanthus*, but the bad weather compelled me to remove the few remaining larvæ from the tree about the first week in September, when they had just reached the third stage.

The larvæ of *Samia Cecropia*, *S. Gloveri* and *S. ceanothi* are very much alike, and hardly any difference can be observed in the first two stages. In the third and fourth stages the larvæ of *S. ceanothi* and *S. Gloveri* are also nearly alike, the principal

difference between these two species and *S. Cecropia* being that their dorsal tubercles are of a uniform colour, orange-red or yellow, while on *Cecropia* the first four dorsal tubercles are red and the rest yellow. The tubercles on the sides are blue on these three species, which are very closely allied. From my notes I take the following on *Samia Gloveri*:—1st stage, larvæ quite black; 2nd stage, larvæ orange with black spines; 3rd stage, dorsal spines orange-red, spines on the sides blue; 4th stage, dorsal spines orange or yellow, spines on the sides blue, body light blue on the back and greenish yellow on the sides, head green, legs yellow; 5th and 6th stages, larvæ nearly the same, tubercles on the back yellow, the first four having a black ring at the base, side tubercles ivory-white with a dark blue base. The larvæ of hybrid *Gloveri-Cecropia* were, as far as I could observe, like those of *Cecropia*, but some had six red tubercles on the back, instead of four as *Cecropia*.

For the first time I became acquainted with the larva of *Attacus Roylei*, the Himalayan oak-silkworm, but only obtained two pairings from about sixty cocoons; this species I found most difficult to pair in captivity. The few larvæ I had of this species did not go beyond the fourth stage, owing to the bad weather; but it has been successfully reared on the continent of Europe. From a letter just received from a correspondent in Vienna, I hear that with twenty-five eggs he obtained twenty-three larvæ, which all lived, and produced twenty-three large cocoons. The same correspondent, with thirty-five eggs of *Samia Gloveri*, obtained twenty cocoons; the larvæ were reared on a species of willow, very likely a form of *Salix caprea*, with narrow leaves, white on the under side. The weather in Vienna was very fine and warm up to the end of August; then not so hot, but still fine.

Another species, which I produced this year, is a new hybrid obtained by the crossing of *Roylei* (female) with *Pernyi* (male). I obtained six such pairings, of long duration, and the eggs were all fertile. The rearing this hybrid has been successful not only in Europe, but also in the U. S. of North America. The cocoon of this hybrid is much richer in silk than that of *Roylei*, and the larva seems stronger and easier to rear than *Roylei*. The cocoon of *Roylei*, thin and poor in silk, although it is of fine texture, is surrounded by a large tough envelope; the greater part of the silk is wasted in the formation of this hard envelope, which

cannot, I think, be of any use. On the contrary, the envelope covering the true cocoon of the hybrid *Roylei-Pernyi* is very small, and leaves no space between the envelope and true cocoon; it is almost like that produced by *Pernyi*. I therefore consider the creation of this new hybrid a valuable acquisition to sericulture, if a sufficient quantity of cocoons has been secured, so as to continue the propagation of the species. The larvæ of my new hybrid are almost similar to those of *Pernyi*. Further information will be given on the rearing of *Roylei-Pernyi* in my next report, when I shall have been supplied with full particulars.

Leaving the silk-producers, I shall say a few words on two American Bombyces reared for the first time in England, and these under glass in the house,—*Orgyia leucostigma* and *Ceratocampa imperialis*.

Orgyia leucostigma.—Eggs of this species, which were unknown when found by my correspondent, were sent to me from Madison, Wisconsin, and I received them on December 29th, 1880. They hatched on May 27th, 1881; the larvæ, which refused to eat the species of maple I offered them, were most successfully reared on oak. The larvæ of this species, which are very beautiful, were exhibited with other larvæ at one of the meetings of entomologists at the Westminster Aquarium. I obtained pupæ, moths, pairings and eggs. The moth is about the same size as that of *O. antiqua*.

Ceratocampa (Eacles) imperialis.—With twenty-four pupæ of this species I obtained nineteen moths from the 21st of June to the 19th of July, and two pairings; five pupæ died. The pupæ are large, and armed with sharp points at all the segments. The moths are from four to six inches in expanse of wings, of a bright yellow, with large patches, and round spots of reddish brown with a purple gloss; besides these patches and round spots, the wings are covered with small dark dots. The male moth is much more blotched with brown than the female, and, although of a smaller size, more showy than the female. The two pairings took place, the first from the evening of the 13th till the morning of the 14th, the second from the evening of the 15th till the morning of the 16th of July. The ova commenced to hatch on the 31st of July. Eggs large, about the size of those of *Yama-Mai*, *Pernyi*, or *Mylitta*, rather flat, and concave on one side; they are of an amber-yellow colour, and transparent, like those of *Sphingidæ*.

When the larvæ have absorbed the yellow liquid in the egg, and are fully developed, they can be seen through the shell of the egg, which is white or colourless, when the larva has come out. The larvæ of *Imperialis* have six stages, and the dates of the stages of those I reared here are as follows:—First stage commenced on July 31st; second, August 7th; third, August 17th; fourth, August 29th; fifth, September 18th; and sixth, October 1st. Larvæ went into ground to pupate on October 13th and 14th.

The larvæ of this curious species vary considerably in colour; some are of a yellowish colour, others light brown or tawny, others black or nearly black. In all the stages the larvæ have five spines or horns; two on the 3rd segment, two on the 4th, and one on the last segment but one; this is taking the head as the 1st segment, with regard to the first four spines. These spines are covered with sharp points all round, and their extremities are fork-like. In the first three stages they are horny; in the last three stages these spines are fleshy, and much shorter in proportion than they are in the first three stages. The colour of the spines in the last stages is coral-red, yellowish, or black. In the fifth and sixth stages the spine on the last segment but one is very short. A further description of the larvæ of *Imperialis* in all its stages will be given in my next report. They were reared in the house, under glass, and with the greatest success, till they went into the ground to turn into pupa state.

As soon as my *Imperialis* had hatched I gave them various kinds of foliage, plane-tree, oak, pine, sallow, &c. At first they did not touch any kind of foliage, and I was afraid I should be unable to rear them; but on the second or third day of their existence they made up their minds and decided upon eating the foliage of some of the European trees I had offered them. They attacked oak, sallow, and pine, but did not touch the plane-tree leaves. In America this species feeds on button-wood, which is the American plane-tree (*Platanus occidentalis*), yet the larvæ did not seem to take to *Platanus orientalis*. After a little time I reduced the foliage to oak and sallow branches, and ultimately gave them the *Salix caprea* only, on which they thrived very well. I was pleased with this success, as I had previously read in a volume of the Naturalist's Library a description of *Ceratocampa imperialis*, which ends as follows:—"The caterpillars are not

common, and are the most difficult to bring to perfection in confinement, as they will not eat in that situation; and even if they change into a chrysalis, they die afterwards."

Before I finish with *C. imperialis*, I must mention a peculiar fact. During the first stage, and I think also during the second, several larvæ disappeared without leaving any traces. I also saw two smaller larvæ held tight by the hind claspers of two larger ones. The larvæ thus held and pressed were perfectly dead when I observed them, and I removed them. My impression then was that these larvæ were carnivorous, not from this last fact alone, as I had previously observed it with larvæ of *Catocalæ* when they are too crowded, but from the fact that some had disappeared entirely from the glass under which they were confined. I began to reduce their numbers, and put six only under each glass, so as to be able to watch them better. Whether I had made a mistake or not, previously to this, I do not exactly know; but from this moment the larvæ behaved in a most exemplary manner, especially when they became larger. They crawled over each other's backs without showing the least sign of spite or animosity, even when they were in sleep, in which case larvæ are generally very sensitive and irritable; all were of a most pacific nature. It is therefore with the greatest pleasure that, for want of sufficient evidence, I withdraw this serious charge of cannibalism which I first intended to bring against them.

Before I conclude this hastily-written article, I shall say a few words on the difficulty of obtaining fertile eggs of Lepidoptera, especially exotic species. I succeeded, as I had done before, in obtaining fertile eggs of *Deilephila elpenor* and *D. euphorbiæ*, but I had a large quantity of pupæ of these two species. With the American species of Sphingidæ, such as *Sphinx quinquemaculata*, *Ceratomia quadricornis*, and *Daremma undulosa*, it was a complete failure, although I sacrificed all the moths, excepting a few. It was the same with the European species, *Smerinthus quercus*. These failures are due to the number of pupæ being insufficient, and also to other causes. The following statements on silk-producing Bombyces will give an idea of some of the difficulties found in the way when trying to reproduce exotic species in captivity, and the losses incurred with these experiments:—

Attacus Roylei.—Sixty cocoons. Moths emerged from March 5th to June 25th. One pairing, which I forgot to mention, took

place on March 6th; the eggs did not hatch, the temperature being too low when the pairing took place. Two other pairings only took place, June 3rd and June 6th; but, as I have mentioned above, six female *Roylei* paired with six male *Pernyi*.

Attacus Atlas (Himalaya race).—Eighty cocoons. Eight moths only emerged from July 31st to September 30th. The cocoons left are in perfect condition, and they will keep till next summer.

Actias Selene.—Sixty cocoons. Moths began to emerge on March 12th, and continued to emerge till August 13th; five months to obtain the moths from all the cocoons. Only one pairing was obtained; it took place on June 30th.

Samia Gloveri.—With about one hundred cocoons. Moths emerged from May 15th till the end of June. Five pairings only.

Telea Polyphemus.—With about sixty cocoons, only three pairings were obtained.

As I have stated, the final or practical result from the larvæ of silk-producing Bombyces reared this season in my garden here has been most unsatisfactory, owing to the bad weather in August; but larvæ of all the species reared have been preserved, and specimens of them in various stages will be seen in the Bethnal Green Museum.

110, Clapham Road, London, S.W.

ON THE SUPPOSED EXTINCTION OF *VANESSA C-ALBUM*.

BY E. S. HUTCHINSON.

“*Vanessa C-album* is undoubtedly becoming scarcer in Great Britain, and is perhaps on the road to utter extinction.” The above is a quotation from a notice in the September number of the ‘Entomologist’ (Entom. xiv. 210), from the pen of Mr. G. Coverdale; and as it winds up with a wish to learn if *V. C-album* is “less common on the Continent or elsewhere,” I hope he may pardon a reply from Herefordshire, which is its great stronghold in this kingdom, although it must differ widely from the views he entertains. I am an old entomologist, and have lived in this county and noted the habits of *V. C-album* for fifty years; and I can safely say I never remember the species so common in any

autumn as the present one, except in the year 1875, when every blackberry bush was covered with specimens of this lovely and distinct species until late into the autumn. There is a habit here in hop-grounds of collecting all the bine after the gathering is over and burning it, and thus all the larvæ and pupæ which have not been destroyed, when the poles are torn down and the hops gathered, perish in the fire, excepting those which have emerged and thus escape destruction. For many years I have bribed those over whom I have a control in this parish to collect for me every larva and pupa they can find, and by this means I have preserved many thousands of this lovely butterfly; hundreds I have sent as larvæ and pupæ to be let loose in Surrey and elsewhere, hoping to introduce the species, but without success; and hundreds have gone to gladden other naturalists in their collections.

This year I have had about one thousand larvæ and pupæ brought me from the few hop-grounds in our parish; and I learn that around Tenbury, where hop-grounds are far more plentiful than here, the species swarms, and it has been sad to see the destruction of larvæ and pupæ. So far on the "extinction" of this butterfly.

I would further wish to utter a protest against confusing three lovely and most distinct species, and striving to teach that they spring from one common stock. In all courtesy I would ask Mr. Coverdale if he is familiar with the larva and pupa of *V. C-album*, and how widely they differ from those of *V. polychloros* and *V. urticæ*? The habit of *C-album* is to lay its eggs singly. I never saw two larvæ feeding on the same leaf, rarely on the same stem. In the spring currant and nettle is the favourite food, in the autumn exclusively hop, so far as my experience goes, always lying exposed on the under side of its leaf. *Vanessa polychloros* and *V. urticæ*, on the contrary, deposit their eggs in masses, and the young larvæ live, as is well known, in webs, and are strictly gregarious, the former on a bough of wych elm (some twenty or thirty feet from the ground), every leaf of which they consume; the latter on nettle, a bed of which is eaten up by one brood. How can anyone seriously propose that these three spring from one stock?

The larva of *Vanessa C-album* is a wonderfully beautiful one, and might well lead to its being placed—as by Mr. Stainton—in

a different genus, so greatly does it differ from any other species of British *Vanessidæ*; the pupa also is far more angulated and beautiful. As to the "indentations of the contour of the wings" interfering with the comfort and well-being of the butterfly, I think anyone who watched, as I did to-day, a number sporting gracefully over a blackberry bush in the warm sunshine would change their opinion.

Vanessa C-album, *V. polychloros* and *V. urticæ* have been handed down to us by our forefathers as three distinct species, and as such, I doubt not, they will be regarded by future generations when the present vague theories have sunk into oblivion.

I will only add that should Mr. Coverdale, or any other gentleman, desire specimens of *V. C-album*, I will gladly forward them, so long as those last which I have set; and next year, if possible, I would send him, or others, larvæ, if they desire to rear the species; but I must warn all that the wonderful abundance of 1875 was followed by a nearly total absence of the species in 1876 and 1877, during which years I did not at any season obtain a single egg, larva or pupa, and one imago only.

Grantsfield, Leominster, October 5, 1881.

ENTOMOLOGICAL NOTES, CAPTURES, &c.

COLIAS EDUSA AT EASTBOURNE.—At the suggestion of Mr. W. H. Harwood, in last month's 'Entomologist' (Entom. xiv. 232), I would record the capture of a male *Colias Edusa* by my sister, on August 28th; and on my way to Beachy Head, September 11th, I took a very fine female. We have seen four others at different times during the season.—R. M. SOTHEY; Rozel, Eastbourne, October 18, 1881.

PROBABLE EXTERMINATION OF HESPERIA ACTÆON AT LULWORTH.—Having for a good many years been in the habit of visiting Lulworth, the head-quarters of *H. Actæon*, I have noticed that this lively little skipper, so prized by collectors, has been becoming scarcer every year. Formerly, in consequence of the inaccessible nature of the place, Lulworth was visited only by the real lover of Nature or the ardent collector; but now steamers from most of the towns on the South Coast carry thousands of

visitors thither, and *H. Actæon* has not a day's respite from the ceaseless inroads made upon its limited domains by the entomologically-inclined portion of these "trippers." Can nothing be done to avert the complete extermination of *H. Actæon* at its old head-quarters? If these collectors (many of whom are only indiscriminate destroyers) could be induced to retain only the bright fresh specimens, and give all the faded worn specimens their liberty again, the chances are that "Lulworth Skippers" would not become an anachronism.—W. M'RAE; Westbourne House, Bournemouth, September, 1881.

HERMAPHRODITE-HYBRID SPHINGIDÆ. — Hermaphrodites of *Smerinthus populi* are far from uncommon, and two were recently exhibited at one of the meetings of the Entomological Society of London; but I was much surprised to read Mr. Briggs's remark in the October number of the 'Entomologist,' that a specimen of the hybrid between *Smerinthus ocellatus* and *populi*, which he had purchased from Mr. Birchall's collection, "was the only hermaphrodite-hybrid *ocellatus-populi* that he was aware of." I was under the impression that hermaphroditism was the usual character of these hybrids; and it has suggested itself to my mind as a possibility, which I have not at present sufficient data either to prove or to disprove, that the sterility of hybrids in general (still a somewhat obscure subject) may perhaps be partly due to hybridism having a tendency to produce hermaphroditism. In vol. iii. (part 3, 1842) of the first series of the 'Transactions of the Entomological Society' (p. 194), Mr. House writes, respecting the *Smerinthus* hybrids in question, "Nineteen caterpillars I reared to perfection, and in August last twelve of the moths came out perfect. . . . The power of reproduction is completely lost, as they appear to be as near intermediate between the sexes as between the species; they evidently partake of the nature of both sexes; as proof, every [newly emerged] insect of the genus *Smerinthus*, on touching, discharges copiously a fluid, which in the male is pure white, in the female of a yellow or ochre-colour. This insect discharged, at the same motion, first the white, and then the ochre fluid quite distinct; and this compound discharge was quite uniform in every specimen, which is never the case in any true species or sex." On p. 195 of the work quoted, Prof. Westwood states that two of these specimens submitted to his inspection were males, so far as related to their external

characters; and adds (p. 202), that in all the hermaphrodite *S. populi* recorded up to that time, the right side was male, and the left female. Mr. J. Adamson, of Hulme, writing about a similar brood of hybrids ('Entomologist's Weekly Intelligencer,' vol. iv. p. 127), also states that in his specimens "in general the sexes are more or less mixed. I had one such a decided male, I was almost inclined to see if it would breed."—W. F. KIRBY; British Museum, October 3, 1881.

SPHINX CONVULVULI IN JULY.—I captured a male specimen of *Sphinx convulvuli* in good condition on July 20th, an unusually early date for its appearance.—J. A. COOPER; 32, Bingfield Street, London, N., October 11, 1881.

SPHINX CONVULVULI AT ASHBOURNE.—I am glad to be able to record the occurrence of this rare hawk-moth in this town. It was taken at rest on a door-post on September 10th, and is now in my possession.—T. H. HALL; Ashbourne.

SPHINX CONVULVULI IN NORFOLK.—On September 16th Mr. Howard, of Tottington, brought me a magnificent specimen of *Sphinx convulvuli* in perfect condition. The insect is now in my collection.—R. A. SLIPPER; The Vicarage, Tottington, Norfolk.

SPHINX CONVULVULI IN LANCASHIRE.—A specimen of this moth, measuring four inches and a half across the wings, was recently captured near here, at rest, by Daniel Marcroft. It is many years since the species occurred in this neighbourhood.—JOHN THORP; Middleton, near Manchester, October 15, 1881.

SPHINX CONVULVULI NEAR MALVERN.—About the end of August or beginning of September a fine specimen of *Sphinx convulvuli* was captured at Great Malvern, and brought to me alive. I heard of another being captured, at Malvern, also.—H. W. LAW; 24, Queen's Gate Terrace, London, S.W.

SPHINX CONVULVULI NEAR LEEDS.—On September 7th a fine female *Sphinx convulvuli* was brought to me alive and in good condition. It was taken at rest on a wall opposite the school in Canal Street, Leeds. Another was given to me which was taken on September 27th in a garden at Burley, near Leeds, flying at dusk over a bed of flowers.—CHAS. SMETHURST; 25, Chatham Street, West Street, Leeds.

SPHINX PINASTRI IN HEREFORDSHIRE.—It will perhaps interest some of your readers to hear that I have caught a specimen of *Sphinx pinastri*. The insect was taken in Herefordshire last month.—C. BATTISCOMBE; Hermitage, Bath, October 12, 1881.

CHÆROCAMPA CELERIO IN SLIGO.—I have much pleasure in recording the capture of a specimen of this rare hawk-moth at Mullaghmore, Co. Sligo, Ireland, on September 17th last. It came to light, and was delicately captured by my sister-in-law, the Hon. Mrs. R. J. Greene, and placed under a tumbler. So far so good. But Mullaghmore is not a fashionable watering-place, and entomological appliances are a conspicuous item in its list of desiderata. The first question was, How to kill it? A family council was held: chloric-acid and laudanum were exhibited; subsequently chloroform, which had to be sent for some fifteen miles off, was applied, and afterwards several severe pinches beneath the thorax were administered by my son, who was present. Ultimately the insect succumbed to these powerful appliances; and forthwith arose question No. 2, How to set it? Everything from an entomological view was wanting. However my son, who is no mean proficient in the "craft," manufactured an ingenious structure out of a huge cork-float belonging to a fisherman's net, in the following manner:—The sides were sloped down, and on each was placed a portion of Cadbury's chocolate box, insecurely attached by tin-tacks, and in the groove thus formed *Celerio* was deposited and set. As no one knew what the moth was, a description (very meagre by the way) was sent to me, and from it I gathered that it might be this rare insect. Upon my son's return home, a fortnight or so later, the first thing exhibited was the moth. On opening the box I beheld, with a feeling somewhat akin to rapture, the finest *Chærocampa celerio* I had ever seen, both as regards size and beauty. There was not the slightest trace of being "rubbed"; the ciliæ even were quite perfect; and the insect itself was set in faultless style. Considering the above-named and other difficulties, the result may be fairly termed "a great performance." So far as I am aware this is the first recorded instance of the capture of *Chærocampa celerio* in Ireland. It was not contained in my own "List of Irish Lepidoptera," drawn up in 1854, and published in vol. i. of the 'Natural History Review;' nor does it appear in the lists subsequently compiled by my friend, Mr. E. Birchall. —[Rev.] J. GREENE; Clifton, Bristol, October 6, 1881.

ENNOMOS AUTUMNARIA NEAR DOVER.—On September 30th I had the pleasure of taking two specimens of *Ennomos autumnaria*, one sitting on a door-step, and one on a lamp-post. On October 2nd I took two more on lamp-posts. Although I have worked very hard since, I have not taken any more, the cold weather which has occurred having no doubt stopped their emergence. —W. DAVIS; 27, Winchelsea Street, Folkestone Road, Dover, October 13, 1881.

ENNOMOS AUTUMNARIA AT HERNE BAY.—It may interest your entomological readers to know that on the 2nd of this month I took a specimen of this scarce insect, drying its wings on a poplar tree at Herne Bay.—S. M'CAUL; Blackheath Club, Bennett Park, Blackheath, S.E., October 10, 1881. (From the 'Field'.)

ENNOMOS AUTUMNARIA (ALNIARIA) NEAR DEAL.—I have great pleasure in recording the capture of this great rarity near here, having taken several specimens extending over a number of years. I thought it was only *E. angularia*, and placed it in my collection as such, having never seen the latter species. I have given away my spare ones to young beginners as *E. angularia*, so that they never come under the notice of any elder student of Entomology. The first time Mr. Tugwell called on me and looked over my collection he pointed out one, a conspicuous female, as *Ennomos alniaria*; the others were allowed to stand as *E. angularia*. That gentleman also saw larvæ feeding, and failed to recognise them; but as soon as the eggs hatched that I sent him I was informed by a stranger that they were *E. alniaria*. Once in possession of their true character, I soon determined to find them out; and, having found a stray one, I commenced to scour the country round here, but could only find an occasional specimen, until returning from a long and fruitless walk I suddenly found myself in the midst of their settlement. Then I went to work with a will, and soon was in possession of twenty-three specimens of the genus, seventeen being *E. alniaria* and six *E. tiliaria*. Though I visited the same place many times afterwards, I can only count up twenty-eight specimens all told. As I understand that a lot of foreigners are introduced as British, I hope entomologists will see a series I intend to send to a friend, to be exhibited at the first Monday of the month's meeting at the Aquarium, when all doubts as to the species being British will be

removed. I have eggs which I hope to breed in the spring, but for the present I have no eggs to spare for enquiring friends.—R. HARBOUR; 1, Landport Cottages, Deal, Kent, Oct. 22, 1881.

ENNOMOS AUTUMNARIA.—On September 28th I took two fine specimens of this rare moth, both from street lamps; one at 6.30 a.m., the other at 9 p.m.—M. RICKETTS; Bouverie House, Folkestone, October, 1881.

ENNOMOS AUTUMNARIA AT FOLKESTONE.—On September 29th, in the evening, I had the good fortune to take a fine specimen of *E. autumnaria* (*alniaria*) from a lamp in the outskirts of the town. The specimen is a male, and in very fine condition.—W. BLACKALL; 9, Church Street, Folkestone, October, 1881.

ENNOMOS AUTUMNARIA.—I am informed by Mr. A. Wailly that both this and last season he sent out to correspondents in many parts of this country a very large number of foreign eggs of this species. As he fears he may have been the accidental cause of specimens of foreign origin being introduced into this country, he wishes me to make this announcement, especially as he has heard of larvæ from such eggs being sold at one shilling each.—JOHN T. CARRINGTON; October, 1881.

ABRAXAS ULMATA DOUBLE-BROODED.—Could you or any of the readers of the 'Entomologist' inform me if *A. ulmata* is double-brooded, as last August I took some of its larvæ at Malvern, and they underwent pupation last month? I noticed that the pupæ were unusually small, only about half the usual size. I was rather surprised at the beginning of this month to find one had emerged; like the chrysalis, it was a dwarf. I have had none emerge since.—ALFRED T. MITCHELL; 3, Clayton Terrace, Gunnersbury, October 22, 1881.

EMMELESIA TENIATA LARVÆ.—In the first week in August a female *E. teniata* laid about a dozen eggs. The young larvæ put in an appearance in the third week afterwards; they are now half grown, and seem inclined to hybernate. The only pabulum they seem to take to is the lower leaves, when withering, of a flowering moss (*Bryum*). I have put one into a box along with some of the plant, which is now in flower, and it has eaten some of the flowers to go on with; but my impression is that this larva feeds on the seeds in spring.—J. B. HODGKINSON; Spring Bank, Preston, October 10, 1881.

EUPITHECIA ABSYNTHIATA FEEDING ON TANSY.—On October 15th I found about twenty larvæ feeding on the blossoms of the tansy, which Mr. G. Baker, of this town, pronounces to be those of *Eupithecia absynthiata*. They are of three different colours,—pink, green, and yellow; the first variety being by far the most numerous, but all are identical in markings. I believe this is a new food-plant for the species; in fact I am not aware that it has been recorded as the food of any Macro-lepidopterous insect.—[Rev.] CHAS. F. THORNEWILL; The Soho, Burton-on-Trent.

NOTES ON PLATYPTERYX SICULA.—I have great pleasure in recording my success in breeding *P. sicula*. In the autumn of last year, after a most diligent search, I succeeded in finding a few larvæ; these turned to pupæ during October. The first specimen, a male, emerged May 18th. I much regret I was unable to obtain fertile eggs. Two pairs were *in copulâ* over twenty hours, but the eggs deposited proved infertile. I have spent a good deal of time this season searching for this moth, but only captured one specimen. As I have done rather better in collecting the larvæ this autumn, I trust I may be successful and obtain fertile eggs.—W. K. MANN; Clifton, Bristol.

HECATERA DYSODEA IN NORTHUMBERLAND.—We understand that the two so-called *H. dysodea*, which were caught at Heaton Hall, Northumberland, in September last, proved to be a case of mistaken identity. The two moths taken at light were the local variety of *Polia chi*, with wings of delicate olive-green interrupted by four transverse series of pure white spots. Five in all have been captured.—Ed.

APECTA OCCULTA AT ELY.—I think perhaps it may interest some of your readers to know that *Apecta occulta* has been taken by me in Ely, at sugar, on September 3rd, 5th and 13th, one on each evening, and in good condition. Mr. Newman says "On the wing in July," and does not record it as being taken in Cambridge-shire. In July last I took *Coremia quadrifasciaria* at Cromer, Norfolk; also at Stanstead, Essex.—W. J. CROSS; Ely.

APECTA OCCULTA NEAR WIMBLEDON.—While collecting in August last, near Wimbledon, I took a specimen of the above insect on a fence. Is not this rather uncommon so near London?—A. SINCLAIR; Fulham, September 26, 1881.

PLUSIIDÆ IN COUNTY SLIGO.—*Plusia bractea*. Sweet-william blossoms appear to be very attractive to this species, as well as others of the *Plusiidæ*. During July last I succeeded in taking fifteen specimens, mostly in excellent condition. The other members of the family occurring here and taken in the same way were *Abrostola urticæ* and *A. triplasia*, *Plusia chrysitis*, *P. iota*, and *P. gamma*, the scarcest being *Plusia gamma*. I have prepared a good bed of sweet-williams for next year, hoping to be able to attract a sufficient number of *Plusia bractea* to distribute to any applicants. Will anyone kindly give me a hint about the larvæ? I have searched hemp agrimony in vain; in fact the reputed food-plant is decidedly scarce here, occurring only in one place, and that to a limited extent.—PERCY H. RUSS; Cullenamore, Sligo, October 10, 1881.

[In a late volume of this Journal Mr. J. B. Hodgkinson wrote, "When looking for larvæ of *Gelechia tricolorella* on the stitchwort (*Stellaria holostea*), I found a large larva of a *Plusia*, which I hope to be *P. bractea*. I used to take it frequently here some thirty years ago; it was feeding upon dog-mercury" (Entom. xii. 182). Mr. George Norman wrote, "My friend N. F. Dobrée took *P. bractea* over flowers of *Centaurea nigra*. The larvæ probably feed on *Ononis arvensis*, which grows in profusion close by" (Ent. Mo. Mag. viii. 211). Following the continental authors, Mr. Kirby writes, "The larva resembles that of *P. iota*, and feeds on hawkweed and dandelion in May and June." Compare Stett. Ent. Zeit. xx., p. 380.—E. A. F.]

UNCOMMON LEPIDOPTERA NEAR NEWCASTLE.—On September 13th Mr. Henderson, of this town, took a fine specimen of *Aplecta occulta* at rest on a stone wall in Jesmond Road, near here; and on the 15th he also captured a good specimen of *Cloantha solidaginis* in the same locality; the latter I believe is quite new to the district, and the other very uncommon. In the beginning of June, Mr. T. H. Hedworth, of Dunston, met with *Lobophora viretata* in considerable quantities at rest on the trunks of beech-trees.—W. MALING; Ellesmere Villa, Granville Road, Newcastle-on-Tyne, October 12, 1881.

PÆDISCA SORDIDANA AND P. OPHTHALMICANA.—I have again taken *P. sordidana*. I took a nice series by beating alder bushes in this neighbourhood, on September 26th. At the same time I

got a few nice *P. ophthalmicana* from poplar.—W. PREST; 13, Holgate Road, York, October 16, 1881.

DESCRIPTION OF THE LARVA OF *PTEROPHORUS TEPHRADACTYLUS*.—In May last year, and again in May of this year, Mr. W. H. Grigg, of Bristol, kindly sent me larvæ of this species feeding on the leaves of golden-rod. Length about half an inch, and of the usual shape characteristic of the genus; rather flattened ventrally, but roofed upwards from the spiracular region to the dorsal area, which is also rather flattened; head polished, about the same width as the second, but narrower than the third, segment; segmental divisions clearly defined; tubercles prominent, each of them emitting several short hairs. Ground colour grass-green, the head pale yellow; there is an interrupted grey line along each side of the dorsal ridge, and a faint indication of a similarly coloured subdorsal line; tubercles greyish white, as are also the hairs; the segmental divisions yellowish. Ventral surface uniformly grass-green. The pupa is attached by the anal segment to a stem or leaf of the food-plant, and although there is no silken belt its position is not suspended, but flat along the stalk or leaf to which it may be attached. It is barely half an inch long, compact, and of moderate bulk; there is a distinct depression extending through the centre of the dorsal surface from the head to the anal segment; and the abdominal divisions, eye- and leg-cases are well defined. Ground colour dingy dull green; the sides thickly prickled with smoke-colour; there is also a smoky stripe through the wing-cases; the hairs grey. The imagos emerged early in June.—G. T. PORRITT; Highroyd House, Huddersfield.

DOES FOOD PRODUCE VARIATION?—From recent experience I should be inclined to answer this question in the affirmative. Whilst larva-beating on Saturday last, I obtained what I believe to be a variety of the larva of *Smerinthus populi*; it has all the markings of this insect, and, in addition, a double row of ten reddish spots on each side, agreeing exactly with the larva described by Rev. W. W. Flemyng in the 'Entomologist,' October, 1880. This insect I found feeding on willow, and although I have placed poplar in the cage it prefers the former for its food. Whether I shall obtain a variety of the imago remains to be seen.—N. C. GRAHAM: Silwood, Tulse Hill, October 6, 1881.

DOES FOOD PRODUCE VARIATION?—Under this title I notice

some remarks at p. 234 of this Magazine. Without commenting on that article, I may state for the guidance of others that I am always most successful in rearing varieties when I feed the species all through, while in the larval stage, with the *same* kind of food.—C. SMETHURST; 25, Chatham Street, Leeds.

INSECTS AND THEIR FOOD-PLANTS.—About two years ago I drew attention in the pages of the 'Entomologist' to the wonderful instinct possessed by insects in discovering plants to feed upon not indigenous or common in cultivation, but which have an affinity to those native plants on which their larvæ are generally met with, instancing the *Buddlea globosa*, an American shrub of ornamental character, with the little weevil *Cionus schropulariæ*. I now again find the same shrub this season almost denuded of its leaves by a schropulariaceous feeder of another order, namely, the larva of the common mullein moth, *Cucullia verbasci*, in a friend's garden at Croydon. Fortunately for him the larvæ, being of a very conspicuous and showy character and in considerable numbers (more than would fill a pint measure), were detected by his boys before too much mischief had been done; and as a consequence the young collectors of the neighbourhood were only too anxious to transfer to their breeding-cages what would have been a nuisance and an eyesore had they not been discovered in time.—V. R. PERKINS; 20, Gloucester Street, S.W., August 20, 1881.

ENTOMOLOGICAL NOTES FROM 'BOURNEMOUTH.—About the beginning of July last a fine specimen of *Deiopeia pulchella* was caught by a lady in a garden in this town. I have also to record the capture of several specimens of *Sphinx convolvuli* during the early part of September; three were brought to me alive and in fine condition, and I was informed that others were captured in various parts of the town; but while congratulating ourselves on the addition of one or two "good things" to our cabinets, we have to deplore the general scarcity of our usual autumn species. Sugaring here during the last ten weeks has been an entire failure; an occasional earwig or spider regaling itself in solitary luxuriance on our sweets is about the only living thing that greets the expectant eye of the collector. Even the bold *Xylophasia polyodon* and persistently intrusive *Phlogophora meticulosa* are "conspicuously absent." The usually abundant and ubiquitous

Plusia gamma has scarcely put in an appearance at all; I believe I have seen only two during the whole season. Over the New Forest, where extensive defoliation prevailed about midsummer, doubtless causing the starvation of myriads of newly-emerged larvæ, we might reasonably have anticipated a dearth of autumn species; but here no such denudation existed: it is therefore difficult to assign any cause for the general scarcity of our common species. It would be interesting to know the experience of other collectors in other parts of the country.—W. M'RAE; Westbourne House, Bournemouth, September 21, 1881.

LASIUS MIXTUS, *Nyl.*: AN ANT NEW TO BRITAIN.—On the 2nd September last, at Bickleigh, about eight miles from Plymouth, I had the pleasure of seeing a family of ants on an old bramble stem. They were evidently enjoying themselves in the bright sunshine, but their enjoyment was of short duration after I had "spotted" them, for I at once prepared to box a few, which I did by holding my box under and giving the stem a gentle tap. I secured about a dozen, consisting of males and females. Below them on the ground were the workers in great commotion; of these I obtained a few. At the time of capture I took them to be *Lasius umbratus*. After reading Mr. Smith's description I discovered my error. I visited the locality again on the 6th and several times since without seeing a single worker. They must be very retiring in their habits; and my only chance of renewing my acquaintance with them will be at their next family gathering, when I hope to have the pleasure of being "an uninvited guest." In order to ascertain what my captures were I sent specimens to Mr. Saunders, who very kindly informed me that they were *Formica mixta* of Nylander. They are of the race of *L. umbrata*, but differ from it as follows:—In colour the males and workers are very similar; the female, however, is brownish black. The male has the eyes destitute of hairs. The female has the head much smaller, *nearly* as wide as the thorax; the fuscous cloud at the base of the wing is not so dark, but extends *beyond* the discoidal cell, and the discoidal cell is smaller.—G. C. BIGNELL; 7, Clarence Place, Stonehouse, Plymouth, October 12, 1881.

HAGGERSTON ENTOMOLOGICAL SOCIETY.—On Friday, October 21st, this Society held its Annual Exhibition of insects of all orders. The new feature of the year was the temporary migration of the Society from its usual meeting-room, where the exhibitions

have hitherto been held, to a school-room in the neighbourhood. Though much larger than the old room, the space allotted to exhibits was fully covered; and at least a thousand persons must have attended during the evening. In regard to the insects of the year exhibited, they did not seem to be quite up to the average either in rarity or variation. Nevertheless, as a whole, it was an interesting and instructive show. Undoubtedly the case which commanded most attention of the initiated was that shown by Mr. Boden; in it was a series of fifty-four varieties of *Peronea hastiana*, a variety of *Toxocampa pastinum*, curious white-spotted variety of *Leucania lithargyria*, beautiful series of *Coremia quadri-fasciaria*, varieties of *Venilia maculata*, *Rivula sericealis* (cloudy), *Catoptria hypericana* (with silvery under wings), and curious form of *Coccyx splendidulana*; the southern form of *Peronea Caledoniana*, with Scotch examples for comparison; several *Mixodia Bouchardana* from Kent, and other rarities: all were remarkable for the beauty of condition and perfect setting. Mr. Jobson exhibited long series of *Stauropus fugi*, black form of *Limenitis Sibylla*, and other New Forest species; also some living larvæ of *Limacodes assellus*, showing their mode of hybernation. Mr. Cooper, two varieties of *Argynnis Aglaia*, *Apatura Iris* var. *Iole*, and the hybernated *Vanessa Antiopa* already recorded. Mr. H. Bartlett, many nice and well-set Lepidoptera of the year, including a variety of under side of *Thecla betulæ*. Mr. Meek exhibited a case of the rare Bornean butterfly, *Ornithoptera Brookeana*, which for exceeding brilliancy of colour was unsurpassed. Mr. Southey, a *Deiopeia pulchella* taken in 1880, varieties of *Abraxas grossulariata*, &c. Mr. F. Bartlett, case of the season's Lepidoptera, including fine series of *Cosmia pyralina*. Mr. T. F. Briggs, a pair of *Notodonta carmelita*, &c., taken this season at West Wickham. Mr. Eedle showed a case of life-histories of Lepidoptera preserved with his usual skill; Mr. J. Russell, many preserved larvæ of the same order; and Mr. Blaxton, case of carefully-preserved life-history of *Cossus ligniperda*, showing not only the changes of the insect, but some of those of its parasites. Mr. C. H. Williams also showed well-preserved larvæ, including *Cucullia verbasci* and *C. lychnitis* on a sprig of mullein. Mr. Bryant, a diaphanous form of *Bombyx quereus*, yellow-banded *Sesia culiciformis*, &c. Mr. E. Anderson, interesting collection of Macro- and Micro-Lepidoptera, and water-colour drawings, by himself, of larvæ of

the same order on their food-plants. Mr. Hockett, another collection; he had also lent many cases of ornithological subjects for the decoration of the room. Mr. Chas. M. Allen sent a case illustrating all orders of insects. Messrs. Vandeburgh, a small collection of Coleoptera, Neuroptera, &c.; and Mr. Leacock, some generic types of Coleoptera, especially wood-borers, and a series of species which he had taken from a single dead duck. Messrs. Harper, sen., and Mr. Clark made a good exhibition with portions of their general collections of Lepidoptera, including many rare species and fine varieties. The visitors included many well-known entomologists, and not a few ladies.—J. T. C.

ENTOMOLOGICAL EVENING, ROYAL AQUARIUM.—Among many other interesting species exhibited at the meeting of October 13th Mr. Wailly showed living larvæ of *Samia Promethea*, *S. cecropia*, and *Saturnia (Hyperchiria) Io*, from North America; also some cocoons, sent from Queensland, which were supposed to be those of a silk-producing Bombyx. These wonderfully-worked cocoons were produced by a spider; one was opened, and the young spiders were seen hatching. The nest has the shape of the cocoon of *Attacus Cynthia*, but is longer and wider. The tough papery envelope is whity brown in colour, and is filled with a mass of soft silky cotton-like material, in the centre of which is placed the batch of eggs and from which young spiders were seen emerging at the time of exhibiting. Mr. Olliff, *Hemerophila abruptaria*, a fine variety, and a rare beetle, *Homalium rugulipenne*, Rye, taken in Caithness. Mr. Eedle, *Peronea cristana* vars. Mr. Cooke, two fine *Nascia ciliaris*. Mr. Meek and Mr. Machin, *Geometra smaragdaria*; those exhibited by the former gentleman were reared from larvæ, by Mr. David Pratt, of Mile End; the latter gentleman also exhibited *Ennomos autumnaria (alniaria)*. Mr. J. A. Clark, four varieties of *Polyommatus Phlæas*, one very black, the others more or less light-coloured; also a white variety of *Dianthæcia carpophaga*. Mr. C. A. Cooper, fine varieties of *Argynnis aglaia*, and an example of *Sphinx convolvuli* taken in August. Mr. H. Bartlett, *Phycis betulella*, *Tethea retusa*, &c. Mr. Tugwell, *Mecyna polygonalis*, *Ennomos autumnaria (alniaria)*, and a fine series of *Nola centonalis* showing much variation of marking; also some living specimens of this species, the pupa-cases, and a beautiful drawing of the larva by Mr. Buckler. About forty-five gentlemen interested in Entomology attended.—J. T. C.



(For description see end of volume.)

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SOME THOUGHTS ON THE DISTRIBUTION OF THE BRITISH BUTTERFLIES.

BY F. BUCHANAN WHITE, M.D., F.L.S.

ACCUSTOMED as we are to the rich vegetation with which most parts of the British Islands are to-day clothed, we are apt to forget sometimes that at no very distant geological period the whole country was totally destitute of all plant-life, and consequently, as a matter of course, uninhabitable by any animals. It is probable, however, that, soon after the present flora came in, the animals which derive their sustenance from it made their appearance, and we may be sure that amongst the earliest would be plant-eating insects, and more especially the Lepidoptera. But it is almost certain (though we have no direct evidence of this) that certain kinds of plants would precede other kinds, and it is therefore likely that the insects would come in like order, and follow the plants on which they fed. If, therefore, we can arrive at some conclusions as to the order in which the plants came, we shall be able to discover one factor in the distribution of the insects. There are, however, other factors whose effect must have been, and still is, very great; and to discover these offers a very interesting problem.

The British Rhopalocera and their present distribution in these islands at the present day may be stated thus:—

| | | | |
|---------------------------------|----------|------------------------------|--------------------|
| <i>Papilio Machaon</i> , L. | England | <i>Pieris Daphidice</i> , L. | England |
| (south-east). | | (south). | |
| <i>Leucophasia Sinapis</i> , L. | England | <i>P. Napi</i> , L. | England, Scotland, |
| and Ireland. | | | Ireland. |
| <i>Euchlœe Cardamines</i> , L. | England, | <i>P. Rapæ</i> , L. | England, Scotland, |
| Scotland, Ireland. | | | Ireland. |

- P. Brassicæ*, L. England, Scotland, Ireland.
Aporia Cratægi, L. England.
Colias Hyale, L. England, Ireland.
C. Edusa, F. England, Scotland, Ireland.
Gonepteryx Rhamni, L. England, (Scotland), Ireland (south).
Vanessa Atalanta, L. England, Scotland, Ireland.
V. Antiopa, L. England, Scotland, Ireland.
V. Io, L. England, Scotland, Ireland.
V. Urticæ, L. England, Scotland, Ireland.
V. Polychloros, L. England, Scotland (sporadic).
V. C-album, L. England, Ireland.
V. Cardui, L. England, Scotland, Ireland.
Melitæa Aurinia, Rott. (= *Artemis*, Hb.) England, Scotland, Ireland.
M. Cinxia, L. England (south).
M. Athalia, Esp. England (south), Ireland (south).
Argynnis Selene, W. V. England, Scotland.
A. Euphrosyne, L. England, Scotland.
A. Adippe, L. England (Scotland?).
A. Aglaia, L. England, Scotland, Ireland.
A. Lathonia, L. England, Ireland (south).
A. Paphia, L. England, Scotland, Ireland.
Limenitis Sibylla, L. England.
Apatura Iris, L. England (south of the Humber).
Hipparchia Semele, L. England, Scotland, Ireland.
Erebia Epiphron, Knoch. England, Scotland, Ireland.
E. Æthiops, Esp. England, Scotland.
Melanargia Galathea, L. England.
Satyrus Megæra, L. England, Scotland, Ireland.
S. Ægeria, L. England, Scotland, Ireland.
Epinephela Hyperanthus, L. England, Scotland, Ireland.
E. Janira, L. England, Scotland, Ireland.
E. Tithonus, L. England, Scotland, Ireland.
Cænonympha Pamphilus, L. England, Scotland, Ireland.
C. Typhon, Rott. England, Scotland, Ireland.
Nemeobius Lucina, L. England, Scotland (south-west).
Polyommatus Arion, L. England.
P. Semiargus, Rott. England.
P. Minima, Fuess. (= *Alsus*, F.) England, Scotland, Ireland.
P. Argiolus, L. England, Ireland.
P. Corydon, Poda. England.
P. Bellargus, Rott. (= *Adonis*, Hb.) England.
P. Icarus, Rott. England, Scotland, Ireland.
P. Astrarche, Bergstr. (= *Agestis*, Hb.) England, Scotland.
P. Ægon, W. V. England, Scotland, Ireland.
Lycæna Dispar, Haw. England (formerly).
L. Phlæas, L. England, Scotland, Ireland.
Zephyrus Betulæ, L. England, Ireland.
Z. Quercus, L. England, Scotland, Ireland.
Thecla Rubi, L. England, Scotland, Ireland.
T. Pruni, L. England.
T. W-album, Knoch. England.
Hesperia Malvæ, L. (= *Alveolus*, Hb.) England, Scotland, (Ireland?).
Nisoniades Tages, L. England, Scotland, Ireland.
Cyclopides Palæmon, Pall. (= *Paniscus*, F.) England.
Pamphila Comma, L. England.
P. Sylvanus, Esp. England, Scotland, Ireland.
P. Actæon, Esp. England (south).
P. Thaumias, Hufn. (= *Linea*, F.) England, Ireland.

From this statement it will be seen that all the sixty-four species enumerated above are found in England, but that twenty-eight (not including three of doubtful or sporadic occurrence) do not inhabit Scotland, and twenty-five, or perhaps twenty-six, have not been detected in Ireland.

It remains, therefore, to discover (if we can) the reasons why certain species are absent from Scotland and Ireland, why certain others which inhabit Scotland do not occur in Ireland, and why some of the Irish species are not also Scottish. Having discussed these points we will then pass on to the question of the order in which the various species arrived in Britain.

In trying to find reasons for the absence from, or presence in, a country of any particular species, there are several things which must be first taken into account, as, for example, the accessibility of the country, the presence in it of the food-plant, the climatic conditions, &c.

It seems unnecessary to remark that a species will spread much more easily over a comparatively level land-surface than across a sea, or even over a mountain range. As far, therefore, as mere accessibility is concerned, the butterfly fauna of Scotland ought to be more extensive than that of Ireland, for in the one case there is still a continuous land-surface, in the other a formidable passage across the sea must be encountered. That this was not always the case is now well known; but before entering on the subject we propose discussing, it will be well to give an outline of part of the geological history of the British Islands in post-glacial times.*

Immediately after the Glacial Period (during which great ice-sheets covered the most of North and North-western Europe, including the British Islands) the area of Great Britain and Ireland was much the same as it is now, though South Scandinavia was submerged. At this time the climate was genial, and the plants and animals which had been driven south by the cold began to come north again. After this, or in middle post-glacial times, the land rose, and our islands were joined to continental Europe. This land connection was very extensive, all the sea-bottom which is not now more than one hundred fathoms from the surface being then dry land. This would give us an area

* For a fuller account the reader is referred to Dr. James Geikie's 'Great Ice-Age' and 'Pre-Historic Europe'; also 'Scottish Naturalist,' v. 202.

reaching from Denmark to Shetland, the Færøes, and probably Iceland, thence passing outside the Hebrides and Ireland, and gradually joining the present French coast-line in the extreme south-west. All this area was not, however, dry land, for it was in places intersected by great rivers and lakes, the most important of the latter being one lying between England and Ireland, and reaching from opposite Wales to beyond the North of Ireland. As I have already pointed out the climate was then genial, and there was an enormous growth of forests.

In late post-glacial times Britain became again insulated, the land area being rather less than it is at present. The climate was colder, with a large rainfall, snow-fields and local glaciers, and an abundant growth of peat. During this time some of the southern animals, which had been tempted northwards by the genial climate, were killed or driven away, and the few that remained decreased both in numbers and in size. After this the land was re-elevated to its present position, and the climate gradually became more congenial.

Having thus briefly sketched the condition of the country during the time that most of our butterflies came in, let us try and discover the reasons for the absence at the present day of some of them from Scotland and Ireland. I say at the present day, because I think it is extremely probable that at one period (say in the middle-glacial times) we had more species than we have now. As, however, there is no proof for or against this, we need not take it into consideration at present.

We will begin with the species absent alike from Scotland and Ireland, somewhere about nineteen in number.

In the first place it may be remarked that there is nothing as regards the food-plants of these species which would tend to prevent their occurrence. They all feed on plants which are as common in Scotland and Ireland as in England. The cause, therefore, of their absence must be sought elsewhere.

In the second place the question of latitude (and consequent climate, for there are other factors in the climatic conditions to be taken into account) must be considered. Are Scotland and Ireland too far north for the species in question? To answer this we must consider the species in detail, with the following result. Four of them, namely, *Machaon*,* *Cratægi*, *Semiargus* and

* For brevity's sake, and as there is no risk of confusion, I drop, in the rest of this paper, the generic names of the species,—F. B. W.

Palæmon, are found beyond or on the arctic circle; while five others occur above or near the 60th parallel of north latitude, namely, *Polychloros* (which has occurred in Scotland, though perhaps it can scarcely be considered a true native), *Cinxia*, *Adippe*, *Arion*, and *Palæmon*; and four more, namely, *Daplidice*, *Bellargus*, *Pruni* and *W-album* have been detected in Scandinavia. We thus have thirteen species which inhabit latitudes north of the British Islands, and which, therefore, so far as that goes, ought to occur in Scotland and Ireland. Of the remaining six species, *Dispar* may be put aside as a species the typical form of which was confined to England, and is now unhappily extinct. For the remaining five—*Sibylla*, *Iris*, *Galathea*, *Corydon* and *Actæon*—the latitude of Scotland and Ireland is rather beyond the range of the species.

Let us now return to the thirteen species which range north of Britain, and find, if possible, a reason for their absence. For most of them the reason is, I think, the *insular* nature of the climate. By an “insular” climate is meant one which by the proximity to the ocean has a greater humidity and less extremes of heat and cold than is the case when the ocean is more distant, or its influences obstructed by intervening high land. That an insular climate affects very considerably the range of plants has now been proved, and it is but natural to suppose that similar influences may affect insects. Of the thirteen English species whose absence from Scotland and Ireland we are now considering, several, if not all, occur in those parts of England which have a more “continental” climate. Of these *Machaon*, *Daplidice*, *Cinxia*,* *Arion*, *Palæmon*, *Comma*, are good examples. But in addition to these climatic reasons there is the unexplained tendency of some species to be local and rare, especially on the confines of the regions that they inhabit, and which must not be altogether lost sight of in discussing geographical distribution.

Let us next consider the species, nine in number, which inhabit Ireland, and are not to be found in Scotland. Of these, six—*Sinapis*, *Rhamni*, *C-album*, *Athalia*, *Lathonia* and *Argiolus*—occur in latitudes north of Scotland (two of them, *Athalia* and *Lathonia* being indeed arctic), two are Scandinavian (*Betulæ* and *Thaumas*), and the remaining one, *Hyale*, has been possibly seen

* It must not be supposed that because the Isle of Wight is an island that its climate is thereby “insular.”

in Scotland, as indeed has *Rhamni*. That some of these occur in South Scotland is not improbable, but the chief interest their apparent absence possesses is from the belief, held by many naturalists, that Ireland derived its fauna from Scotland. If such be the case, and these species were once inhabitants of Scotland, it may have been in the more genial climate of middle post-glacial times, and that they perished in the less genial period which followed. Flourishing as they do in the mild and humid atmosphere of the South-west of Ireland, it seems clear that they are not dependent on a "continental" climate, as we have supposed some of the species absent alike from Scotland and Ireland to be.

The distribution of the species which occur in Scotland, but are absent from Ireland, must now be considered. They are five in number; and if it be the case that *Helianthemum vulgare* is the food-plant of *Astrarche* (as it certainly is of its variety *Artaxerxes*), then the absence of that species can be accounted for. I believe, however, that it also feeds on *Erodium cicutarium*, which, unlike the *Helianthemum*, is an Irish plant.

Of the five Scottish species not found in Ireland three (*Selene*, *Euphrosyne* and *Astrarche*) are arctic, one (*Lucina*) occurs in South Sweden, and the remaining one (*Æthiops*), though a species of central Europe, has so wide a distribution in Scotland that its absence from Ireland is very remarkable. So far as can be seen there is no climatic reason by which the absence (if such be really the case) of these species can be explained. We are, therefore, driven to suppose that the land connection with Ireland must have been severed before they were able to establish themselves, and that no friendly wind has since wafted them across the narrow sea, and so implanted them in the Emerald Isle.

In connection with the whole group of the British butterflies there is a question of much interest, but one to which we can scarcely hope to get a satisfactory answer. It is this. In what order relatively did the various species come to Britain? There is also another matter on which the exotic distribution (that is the distribution in other countries than Britain) throws a certain light, and that is the relative antiquity of each species.

We will first briefly discuss the latter question.

It may be taken for granted that, unless circumstances (*e.g.*, human agency, conscious or unconscious), have been exceptionally favourable, species which have the widest distribution are probably

of greater antiquity than those whose distribution is less extensive. Species, therefore, which are inhabitants of both the old and new worlds may justly be considered to be of greater antiquity than species which are confined to Europe. It is probable, in fact, that the less wide the distribution, the younger the species, unless we have direct or indirect evidence to show that it is a species which is dying out, and which situated in some happy spot, where the struggle for existence is less intense, leads a peaceful and undisturbed life. Such a spot may be found in some of the oceanic islands, but scarcely in Europe, where only the species best fitted to survive have passed safely through the ups and downs of the eventful Glacial Period.

To begin with the species of restricted distribution.

Facile princeps amongst these would be the now extinct *Lycæna dispar*, which seems to have been confined to England, though its var. *Rutilus* inhabits Central and East Europe and North and West Asia.

Next in order come *Sibylla*, *Epiphron*, *Galathea*, *Typhon*, *Lucina*, and *Corydon*, all of which seem to be confined to Europe proper, and in most cases to Central Europe, none of them except *Typhon* (which is arctic) ranging very far north, though possibly one or two reach Asia Minor.

The next lot occur in Europe and in North and West (or North or West) Asia, and include *Sinapis*, *Cratægi*, *Polychloros*, *Cinxia*, *Adippe*, *Iris*, *Semele*, *Æthiops*, *Megæra*, *Hyperanthus*, *Arion*, *Minima*, *Betulæ*, *Quercus*, *Pruni*, *W-album*, *Tages*, and *Palæmon*.

The thirty-nine species which remain have a wider range.

Of these at least seven—*Machaon*, *Hyale*, *Edusa*, *Lathonia*, *Icarus*, *Astrarche*, and *Phleas*—reach the Himalaya, and two others, *Brassicæ* and *Argiolus*, have representative forms there. Three at least reach Japan, namely, *Hyale*, *Edusa*, and *Io*.

A rather large number occur on the south side of the Mediterranean, and are recorded from North Africa, viz., *Machaon*, *Daplidice*, *Rapæ*, *Brassicæ*, *Hyale*, *Edusa*, *Rhamni*, *Atalanta*, *Antiopa*, *Aurinia*, *Lathonia*, *Ægeria*, *Janira*, *Pamphilus*, *Argiolus*, *Bellargus*, *Icarus*, *Astrarche*, *Phlæas*, *Rubi*, *Actæon*, and *Thaumas*.

One—*Hyale*—occurs in South Africa, where *Edusa* is represented by the closely allied species *Electra*.

In North America, but chiefly on the western side of that Continent, several species are said to have been found. Of these *Machaon*, *Antiopa*, *Atalanta*, and *Phlæas* seem certainly to occur, while *Hyale*, *Edusa*, *Rhamni*, *Comma*, *Sylvanus*, and *Thaumas* have all been reported, and if they do not actually occur are represented by species very closely allied, as are *C-album*, *Aglaiia*, and *Argiolus*. A supposed variety of *Rubi* has been found in California, and *Rapæ* has been introduced into Canada, &c., in late years, and seems already to have developed a climatic race.

Finally, *Cardui* appears to occur nearly all over the world, except in South America.

Of the species mentioned above, twenty-one have been found within or near the arctic circle, namely, *Machaon*, *Cardamines*, *Napi*, *Antiopa*, *Urticæ*, *Athalia*, *Selene*, *Euphrosyne*, *Aglaiia*, *Lathonia*, *Tithonus*, *Pamphilus*, *Typhon*, *Semiargus*, *Icarus*, *Astrarche*, *Ægon*, *Phlæas*, *Rubi*, *Malvæ*, and *Comma*.

If we are to judge, therefore, from the wide distribution, we must place *Cardui* at the head of the list. It must be kept in mind, however, that this butterfly is a strong flyer, and of a roving disposition, and may have extended its area in comparatively recent times. On the other hand, it evidently belongs to a very ancient family, and the probabilities are in favour of its early existence.

Next in age to *Cardui*, even if not surpassing it, I am inclined to put *Hyale*, on account of its occurrence in South Africa. This is not the only European insect that inhabits that region, and it seems incredible that they should have all got there by migration across Africa in its *present* condition. In fact, their presence alone would suggest the probability of a more temperate climate having once prevailed in tropical Africa, but we have other and stronger evidence that such was really the case during the Glacial Period. When intense cold, with extensive ice-sheets and snow-fields, covered the greater part of Europe, the meteorological conditions of the African Continent must have been materially affected, and the greater part of the European temperate fauna and flora must have been driven to take refuge on the south side of the Mediterranean, which was then bridged, as it were, by several land connections between Europe and Africa. That many of the refugees penetrated far to the south there is evidence to show, from the species of arctic plants that still

linger here and there on some of the African mountains. It is not demanding too much to suppose then that *Hyale* is at least as old as the Pre-Glacial Period, and probably *much* older. A similar age must be assigned to *Edusa*, which, though not present in South Africa, is there represented by a very close ally, as it also is by another in North America, the latter being indeed scarcely distinguishable.

To the species common to Europe and America a considerable antiquity may be allowed. In connection with them, the interesting question arises, "In which hemisphere did they originate?" or how did they pass from Europe to America, or *vice versâ*. Their origin may have been just as well in one as in the other, but I think there is a slight probability in favour of an American origin for at least some of them. Perhaps, however, their birthplace may have been in the circumpolar lands, which seem at one time to have had a rich fauna and flora, and where it is by no means impossible that many palæarctic species were developed. But be this as it may, most of the evidence for the line of passage from America to Europe, or Europe to America, is in favour of Behring's Straits, or rather of the land connection that formerly existed there. Not much can be said in favour of a passage by Iceland and Greenland, for between Greenland and America there seems to have been no direct land connection.

Let us turn now to the question of the antiquity of the species in Britain.

In the first place, it may be said that, with perhaps one or two exceptions, there is really no reason why any of the species may have been inhabitants of Britain for more than a few thousand years. Continental Europe is so close, that it is quite within the bounds of possibility that many of the species might have flown over, or been blown over, any time within (say) a thousand years. Still the probabilities are against this, and in favour of their arrival with the rest of our indigenous fauna and flora, which came to us across the dry bed of the German Ocean.

As regards plants and wingless animals, a certain amount of evidence as to the order of their arrival may be gathered from their existence or non-existence in various of the outlying groups of islands in proximity to Britain. If we find certain species in these islands, the probability is that they arrived there before the land connection was cut off, and that consequently they arrived

in Britain at an earlier period than the species which (*ceteris paribus*) do not exist in these islands. But with butterflies such evidence is scarcely satisfactory. Furnished with wings, and of light gravity, they may have been introductions of a much later date. On the other hand, they may have once existed, but been killed out by altered climatic conditions, and from their perishable structure left no traces of their presence.

If, however, we arrange the species in the order in which their existence in the outlying islands would suggest, we arrive at the following results:—

Iceland was cut off before any of our species reached it, for though six butterflies have been very doubtfully recorded from that island, none of them are British species.

From the Færøe Islands I have seen no record of the occurrence of any butterflies.

From Shetland only three species have been recorded, viz., *Atalanta*, *Cardui*, and *Typhon*.

In Orkney the following have been noticed:—*Atalanta*, *Cardui*, *Typhon*, *Brassicæ*, *Rapæ*, and *Icarus*.

In the Hebrides, *Brassicæ*, *Typhon*, and *Icarus*.

In Ireland thirty-nine or forty species, of which a list was given at the beginning of this paper, and which include in their number all the few species of the other islands.

If any dependence can be placed on evidence such as this, one might conclude that *Typhon* was one of the earliest to come to Britain, and seeing that it is an arctic species, and considering the nature of the places which it inhabits, and the food-plant of its larva, I think some justification may be found for this belief.

Next in order to it I should be inclined to place *Icarus*, which is also an arctic species.

As for the others just mentioned, not much can be learnt from their occurrence. *Cardui* and *Atalanta* are both strong flyers and wanderers; *Brassicæ* and probably *Rapæ* are both probably recent introductions with cultivated cruciferous plants.

We now come to the forty Irish species. As has been already mentioned, many naturalists hold, and on good grounds, that the main part of the fauna and flora of Ireland reached that island by way of Scotland, and that, in fact, the species were Scottish before they became Irish. But, however true this may

be for some groups, it is, I venture to think, only partly applicable to the Lepidoptera.

It will be remembered that at the time when the British Islands were receiving the bulk of their animals and plants, and when there was land connection between the Continent and the various islands, that a large lake of considerable breadth extended from Wales to beyond the North of Ireland. From this lake a large river flowed south, and being joined probably by the Seine and other French rivers, emptied itself into the Atlantic. That this lake and river formed an effectual barrier to the passage of many animals and plants, and necessitated their passing round the head of the former, and so reaching, by way of Scotland, the North of Ireland, may well be believed. But it seems quite possible that many Lepidoptera were able to fly across the river. If such was the case, there is no need of believing that the butterflies common to England and Ireland, but not now found in Scotland, passed through Scotland on their way to Ireland. In fact, some of them need not necessarily have passed through the present area of England either. Hence the occurrence of certain species in Ireland does not present sure evidence of their arrival in Britain before the communication with Ireland was cut off.

Are there any other grounds on which we can base the relative antiquity in Britain? In the first place (as suggested at the beginning of this paper), the relations of the species to its food-plant; and, in the second, the range or distribution at home and abroad, may afford some evidence. In some cases these two factors may be considered together. Flowering plants (to which division all the food-plants of the British butterflies belong) may be classed as self-fertilised or anemophilous (or wind fertilised), and entomophilous, or requiring for the most part insect-agency for fertilisation. It is reasonable to suppose that the first of these—the self-fertilised and anemophilous plants—would establish themselves before the entomophilous plants (the reader will remember that the ice-age had cleared Britain of every living thing, animal and vegetable), since the plants would precede the insects that fed on them, and the self-fertilised or anemophilous species would have an advantage at first over the entomophilous ones. Consequently, the insects which fed on the self-fertilised and anemophilous plants would in like manner have at first

greater facilities for establishing themselves than the entomophilous plant eaters. Similarly, as annual and low-growing plants sooner reach maturity than perennial herbs and plants of a shrubby or arboreal nature, the insects which find their food on them would have a slight advantage.

Again, on the other hand, it is not unnatural to suppose that the butterflies which are now found within the arctic circle were better fitted to follow closer the retreating ice-sheets and snow-fields than those species which are not found outside the more temperate regions.

We will now see how these theories work with the British butterflies. Of the twenty-one which are arctic, the greater number feed on low plants, which are either wind-fertilised or more or less adapted for self-fertilisation. Along with the arctic species two others may be taken, viz., *Epiphron* and *Æthiops*, which, though not arctic, are alpine and subalpine. Their larvæ live also upon anemophilous plants. Keeping in mind then the food-plants, the distribution of the insects, and the nature of the localities which they inhabit, we may arrange these twenty-three in the following manner, indicating the order of their arrival in Britain:—

1. *Typhon*, *Pamphilus*, *Epiphron*, *Æthiops*, feeders on grasses and sedges, and inhabiting moory ground, such as we may suppose to have been formed early in post-glacial times.

2. *Icarus*, *Phlæas*, *Tithonus*, *Aglaia*, *Euphrosyne*, *Selene*, *Lathonia*, *Athalia*, *Urticæ*, *Napi*, *Cardamines*, also feeders on low plants either wind-fertilised or chiefly adapted for self-fertilisation. Many of them also inhabiting moory situations.

3. *Astrarche*, *Machaon*, *Comma*, *Ægon*, *Semiargus*, *Rubi*, *Malvæ*, *Antiopa*, mostly feeding on plants where cross fertilisation by insect-agency prevails, some of them being also of a shrubby nature.

The remaining species, which are not arctic, may be arranged in like manner:—

1. *Semele*, *Megæra*, *Janira*, *Hyperanthus*, *Ægeria*, *Sylvanus*, *Thaumas*, *Palæmon*, *Actæon*, *Atalanta*, *Io*, *Cinxia*, *Adippe*, *Galathea*, *Sinapis*, *Daphidice*, *Brassicæ*, all feeders on low plants that are mostly wind or self-fertilised.

2. *Corydon*, *Arion*, *Minima*, *Bellargus*, *Hyale*, *Edusa*, *Aurinia*, *Cardui*, feeders on low plants mostly cross-fertilised.

3. *Lucina*, *Cratægi*, *Rhamni*, *Polychloros*, *C-album*, *Betulæ*, *Pruni*, *W-album*, *Sibylla*, *Argiolus*, *Quercus*, *Iris*, almost all feeding on plants of a shrubby or arboreal nature, many of them requiring cross-fertilisation. The insects, too, are partial to woodlands, and possibly did not come in till the forest period.

In conclusion, the facts or theories briefly alluded to in the foregoing pages may be thus summarised:—

1. Britain derived its butterfly fauna from continental Europe in post-glacial times.

2. The absence of certain English species from Scotland and Ireland is not due to latitude, but possibly because the climate is too “insular.”

3. The absence from Scotland of certain English and Irish species is possibly due to temperature.

4. The absence from Ireland of some English and Scottish species appears not to be due to climate, but to the separation of Ireland before these species could reach it.

5. The most widely-distributed species are probably the most ancient.

6. The occurrence of species of butterflies in the outlying islands does not of itself afford sufficient evidence for or against their having reached the islands before the land connection was severed.

7. Though part of the fauna of Ireland reached it by way of Scotland, some of the butterflies probably entered it by the south.

8. Arctic and alpine species probably colonised Britain before species which are neither arctic nor alpine.

9. Species whose larvæ feed on low growing self- or wind-fertilised plants would find their food-plants established before those which feed on cross-fertilised or shrubby plants, and hence be able to establish themselves sooner.

10. Species combining the advantages of 8 and 9 were most probably the first colonists.

Annat Lodge, Perth, November, 1881.

FURTHER NOTES ON THE MACRO-LEPIDOPTERA OF THE SHETLAND ISLES.

BY J. JENNER WEIR, F.L.S., F.Z.S.

IN the 'Entomologist' last year (Entom. xiii. pp. 249—251 and 289—291) I gave some account of the Macro-lepidoptera of the Shetland Isles, which had been obtained by a collector in the employ of Mr. Meek. Emboldened by the success which had attended Mr. Meek's laudable enterprise, Mr. M'Arthur, the collector in question, has visited the islands this year, and by prolonging his stay to a somewhat later period has extended our knowledge of their lepidopterous fauna.

Mr. M'Arthur has added thirteen species to the list given by me last year, viz. :—

Pyrameis Atalanta.

Hydræcia micacea.

Apamea basilinea.

Miana fasciuncula.

Celæna Haworthii.

Caradrina cubicularis.

Noctua C-nigrum.

Hadena dentina.

Plusia gamma.

Emmelesia blandiata.

Cidaria immanata.

Cidaria testata.

Carsia imbutata.

By these additions the total number of Macro-lepidoptera observed in the Shetland Isles has been increased to thirty-eight.

The period during which the collection was made extended from the second week in May until the middle of September. The season was one of the worst known by the inhabitants, being both very wet and cold; so that Mr. M'Arthur was obliged to wear an overcoat during the whole of the summer; the prevailing winds were north-west and south-west.

Of the thirteen new species taken but few present any difference in colour from the ordinary Scottish or English type, and, beyond including their names in the list of captures, call for no further remark; but, on the other hand, some present differences of colour from the normal type such as to render them worthy of notice.

Hydræcia micacea.—Some of the specimens taken are of a darker and richer red than any I have previously seen, but others approach more nearly to the normal colour.

Celæna Haworthii.—The markings are very distinct, and the ground colour somewhat redder than usual; the specimens upon the whole have a richer appearance.

Hadena dentina.—Some of those taken are very darkly coloured, whilst others present but little difference from the English type of the species.

Emmelesia blandiata.—A beautiful series of this charming little moth was taken; the markings are more distinct than usual, and the central dark band is complete, or but slightly interrupted.

Cidaria immanata.—A great number of this species have been captured; the general hue is redder in colour than is usually found to be the case. In this respect they present a noticeable contrast to the examples from the Hebrides of the allied species *Cidaria russata*, which were remarkable for their grey hue, as mentioned in my paper in this magazine for the current year (Entom. xiv. 218—223). It is worthy of note that in the Shetland Isles *C. immanata* alone was taken; and in the Hebrides *C. russata* appears, from the collections made, to be the only indigenous species of these two insects. Some of the specimens of *C. immanata* are decidedly of a rufous colour on the disk of the upper wings, approximating thus in coloration to *C. russata*, to which latter species such a distribution of colour has hitherto been thought to be confined, *vide* the diagnosis of the two species given in Newman's 'British Moths.'

Cidaria testata.—The specimens of this insect are generally much darker than any I have seen before; the central band in some is very dark, almost lead-coloured, and there is also an entire absence of yellow on the wings. I regard them as amongst the most interesting captures.

I will now add a few further remarks on some of the species dealt with last year, in my paper above quoted.

Hepialus velleda var. *Hethlandica*, Stgr.—The males of the ordinary normal type were far more numerous this than last year, in the collections made; and on speaking to Mr. M'Arthur on this subject he informed me that the weather being so very wet at the time the insect appeared on the wing, he captured all he saw of the comparatively small number which were to be had; but last year the weather having been fine, and the insect, as a consequence, more abundant, he had disregarded the silvery

males, and had generally confined his attention to the more remarkable aberrations. It would, therefore, appear that the normal type of the male is more common in Shetland than the collection made last year had led one to infer.

Hepialus velleda.—A very fine series of the beautiful insular varieties of this insect have been captured. The females have the ground colour of the wings pale, the markings thus appear very distinctly. The nearly unicolorous variety, the *Hepialus carnus*, Steph. (non Fab.), does not appear to be found.

Nemeophila plantaginis.—The upper wings of some of the males have almost a white ground colour; on the other hand, some of the females are of a very rich yellow, approaching almost to red on the costa and anal angle of the wing.

Pachnobia hyperborea.—This insect, which remained until 1876 for so many years unique in Mr. Douglas's cabinet, has again been taken by Mr. M'Arthur in some numbers and in great variety.

Dasypolia templi.—As remarked in my paper, last year, out of the specimens taken two were very light in colour. The insect has been captured this year, and the light variety has again been found; but a variety has also appeared very much darker and browner than the usual type, and with two darker bands through the centre of the upper wings.

Anarta melanopa.—The ground colour of the upper wings is much yellower than that of the insect obtained at Rannoch.

Emmelesia albulata var. *Thules*.—A very fine series of this insect has been taken, varying, however, in the extent of the obliteration of the bands on the wings. One I have now before me is almost wholly lead-coloured, with a faint indication of a central band.

Eupithecia venosata.—Some of those taken this year, although of the leaden ground colour, mentioned in my previous paper, have the markings more clearly defined.

Melanippe montanata var. *Shetlandica*.—Mr. M'Arthur has captured a very fine series of this beautiful insular variety. There is a considerable variation in the colour of the wings; but where the ground colour is suffused the markings are faint, and where the ground colour of the wing is white the markings are well defined.

Mr. M'Arthur has also preserved in excellent condition the larvæ of the following species, viz.:—*Dianthæcia conspersa*, showing the caterpillar at different ages, and also as feeding within the capsule of *Silene maritima*; *Pachnobia hyperborea* on *Empetrum nigrum*; *Nemeophila plantaginis* on *Calluna vulgaris*; and *Larentia cæsiata*.

I have to thank Mr. M'Arthur for so kindly allowing me to inspect and describe the valuable collection he has made.

6, Haddo Villas, Blackheath, November, 1881.

CARADRINA AMBIGUA, W. V.

A LEPIDOPTERON NEW TO THE BRITISH FAUNA.

BY EDWARD G. MEEK.

WHILE on a recent visit to Brighton I was looking over some insects belonging to Mr. A. Vine, of Temple Street, in that town, and found four specimens of a *Caradrina* so different from any other British species that I obtained permission to compare them with the moths of that genus in the Doubleday collection of European Lepidoptera at Bethnal Green Museum. On comparison I immediately found Mr. Vine's species was identical with *Caradrina ambigua*, in which opinion I am since confirmed.

The anterior wings of this addition to our fauna may be distinguished from any other British *Caradrina* by the conspicuous yellowish white margins of the reniform and orbicular stigmas; from *C. blanda* by a pale yellow line edging the inner portion of the cilia of the front wings. From both that species and *C. alsines* it is also distinctly separated by the pearly white under wings. The grey ground colour of the front wings reminds one of *C. cubicularis*, from which, however, the other characters render it quite distinct.

Mr. Vine captured the four specimens on one evening in September, 1879, at sugar, near Shoreham, Sussex. Although its captor has since repeatedly sugared on the same ground, he has never seen another example.

56, Brompton Road, London, S.W., November, 1881.

[*Caradrina ambigua* is said to occur throughout Southern Europe, and not to be a common species. In our collections it will be placed between *C. blanda* and *C. cubicularis*.—ED.]

ON THE COLOURS OF FLOWERS AS AN ATTRACTION
TO BEES.

BY SIR JOHN LUBBOCK, Bart., M.P., F.R.S., Pres. Linn. Soc.

(Abstract of a Paper read before the Linnean Society, November 17th, 1881.)

AFTER some prefatory remarks, and criticisms of an experiment by M. Bonnier, Sir John Lubbock said:—

“I do not think, however, that any satisfactory result could be expected from this experiment. In the first place, after the first five minutes there were about thirty bees on each cube, and in less than ten minutes nearly a hundred, and the colour therefore must have been almost covered up. The presence of so many bees would also attract their companions. Moreover, as the honey was all removed in less than twenty minutes, the bees were evidently working against time. They were like the passengers in an express train, turned hurriedly into a refreshment room; and we cannot expect that they would be much influenced by the colouring of the table. In fact, the experiment was too hurried and the test not delicate enough.

Then, again, he omitted blue, which I hope to show is the bees' favourite colour, and his cubes were all coloured. It is true that one was green; but any one may satisfy himself that a piece of green paper on grass is almost as conspicuous as any other colour. To make his experiment complete, M. Bonnier should have placed beside the honey on the coloured cubes a similar supply without any accompaniment of colour to render it conspicuous.

I could not, therefore, regard these experiments as at all conclusive. The following experiments seem to me a more fair test:—

I took slips of glass of the size generally used for slides for the microscope, *viz.* 3 inches by 1, and pasted on them slips of paper coloured respectively blue, green, orange, red, white, and yellow. I then put them on a lawn, in a row, about a foot apart, and on each put a second slip of glass, with a drop of honey. I also put with them a plain slip of glass, with a similar drop of honey. I had previously trained a marked bee to come to the spot for honey. My plan then was, when the bee returned and had sipped about for a quarter of a minute, to remove the honey,

when she flew to another slip. This then I took away, when she went to a third; and so on. In this way I induced her to visit all the drops successively. When she had returned to the nest, I transposed all the upper glasses with the honey, and also moved the coloured glasses. Thus, as the drop of honey was changed each time, and also the position of the glasses, neither of these could influence the selection by the bee.

In recording the results I marked down successively the order in which the bee went to the different coloured glasses. For instance, in the first journey from the nest, as recorded below, the bee lit first on the blue, which accordingly I marked 1; when disturbed from the blue, she flew about a little and then lit on the white; when the white was removed, she settled on the green; and so on successively on the orange, yellow, plain, and red. I repeated the experiment a hundred times, using two different hives, and spreading the observations over some time, so as to experiment with different bees and under varied circumstances. Adding the numbers together, it of course follows that the preference shown for each colour is inversely as the number standing against it. If we add together 1, 2, 3, 4, 5, 6, and 7, we get 28 as the total for each journey, and dividing this again by 7, if no preference were shown, the number for each colour would be 400.

I now subjoin the numbers, giving the first day *in extenso* :—

| Journeys. | Blue. | Green. | Plain glass. | Orange. | Red. | White. | Yellow. |
|-----------|----------|----------|-----------------|----------|----------|----------|----------|
| 1. | 1 | 3 | 6 | 4 | 7 | 2 | 5 |
| 2. | 5 | 4 | 7 | 6 | 1 | 2 | 3 |
| 3. | 1 | 4 | 7 | 6 | 5 | 3 | 2 |
| 4. | 2 | 4 | 6 | 7 | 5 | 1 | 3 |
| 5. | 1 | 4 | 7 | 2 | 6 | 5 | 3 |
| 6. | 1 | 2 | 3 | 6 | 5 | 4 | 7 |
| 7. | 2 | 1 | 4 | 7 | 3 | 5 | 6 |
| 8. | 3 | 4 | 6 | 2 | 7 | 5 | 1 |
| 9. | 5 | 1 | 7 | 4 | 6 | 3 | 2 |
| 10. | 1 | 6 | 7 | 5 | 3 | 2 | 4 |
| 11. | 4 | 6 | 5 | 2 | 7 | 3 | 1 |
| | <hr/> 26 | <hr/> 39 | <hr/> 65 | <hr/> 51 | <hr/> 55 | <hr/> 35 | <hr/> 37 |

In the next series of experiments the bees had been trained for three weeks to come to a particular spot on a large lawn, by

placing from time to time honey on a piece of plain glass. This naturally gave the plain glass a great advantage; nevertheless, as will be seen, the blue still retained its pre-eminence. It seems hardly necessary to give the others *in extenso*. The following shows the general result of the number of visits in one hundred experiments extending over nine days:—Blue, 275; green, 427; orange, 440; plain, 491; red, 413; white, 349; yellow, 405. The precautions taken seem to me to have placed the colours on an equal footing; while the number of experiments appears sufficient to give a fair average. It will be observed also that the different series agree well among themselves. The difference between the numbers is certainly striking. Adding together 1, 2, 3, 4, 5, 6, and 7 we get 28 as the total number given by each journey; 100 journeys therefore give a total of 2800, which divided by 7 would of course, if no preference were shown, give 400 for each colour. The numbers given, however, are—for the blue only 275, for the white 349, yellow 405, red 413, green 427, orange 440, and plain glass as many as 491.

Another mode of testing the result is to take the percentage in which the bees went respectively to each colour first, second, third, and so on. For instance, that out of a hundred rounds the bees took blue as one of the first three in 74 cases, and one of the last four only in 26 cases; while, on the contrary, they selected the plain as one of the first three only in 25 cases, and one of the last four in 75 cases.

I may add that I was by no means prepared for this result. Müller, in his remarkable volume on ‘Alpine Flowers,’ states that bees are much more attracted by yellow than by white.*

I may very likely be asked why it is that if blue is the favourite colour of bees, and if bees have had so much to do with the origin of flowers, how is it that there are so few blue ones? I believe the explanation to be that all blue flowers have descended from ancestors in which the flowers were green, and that they have passed through stages of white or yellow, and generally red, before becoming blue. That all flowers were originally green and inconspicuous as those of so many plants are still, has, I think, been shown by recent researches, especially those of Darwin, Müller, and Hildebrand.

But what are the considerations which seem to justify us in

* *Alpenblumen*, p. 487.

concluding that blue flowers were formerly yellow or white? Let us consider some of the orders in which blue flowers occur with others of different colours.

For instance, in the Ranunculaceæ,* those with simple open flowers, such as the buttercups and *Thalidiums*, are generally yellow or white. The blue *Delphiniums* and *Aconites* are highly specialized, abnormal forms, and doubtless, therefore, of more recent origin. Among the Caryophyllaceæ the red and purplish species are amongst those with highly specialized flowers, such as *Dianthus* and *Saponaria*, while the simple open flowers, which more nearly represent the ancestral type, such as *Stellaria*, *Cerastium*, &c., are yellow and white. I cannot, therefore, concur with Hildebrand in considering that red was the original colour of the family."

The author then proceeded further to discuss the subject of the colours of flowers, and concluded by saying:—

"However this may be, it seems to me that the preceding experiments show conclusively that bees do prefer one colour to another, and that blue is distinctly their favourite."

Sir John Lubbock then made some most interesting remarks upon the Identification of Companions in Ants, on the Recognition of Relations, Peculiarities of Manner, Longevity, and on the genus *Anergates* of the same group of insects, to which subjects we shall on a future occasion refer.

NOTES ON DIPTERA.

BY R. H. MEADE, F.R.C.S.

DIPTEROUS insects, being mostly small in size and sombre in colour, will never excite much interest in the imago or perfect form; but the naturalist who will take up the study of their preliminary states, and endeavour to make out their life-history, will be rewarded for his trouble by the interest he will find in the pursuit. Many species mine the leaves of plants, and the leaves so affected may be easily known either by the blotches or blisters which the larvæ of the larger flies (*Anthomyiidae* and *Trypetidae*) produce, as they separate the two layers of the leaf from each other by eating the cellular succulent tissue between them, or by the tortuous lines which show the course of the mines made by

* I take most of the following facts from Müller's admirable work on Alpine Flowers.

the larvæ of the small mining Diptera (*Phytomyzidæ*, &c.). If these leaves are gathered while the larvæ are at work, and kept in a moist place,—as a wide-mouthed bottle with some damp earth at the bottom, or in a glass-topped box,—the gatherer will in time be rewarded by the emergence of the imago, which is often of great beauty, as the *Trypeta Zoë*, which mines the leaves of the ragwort and groundsel, or the *Acidia heraclei*, which blotches those of the garden celery. Most of these flies are double-brooded, and the leaves gathered in the beginning of summer will produce the perfect insects in about a month, while from those collected in the autumn or latter part of summer no flies must be expected to emerge until the following spring.

My friend Mr. Inchbald is quite an enthusiast in this department, and I have been enabled to clear up the life-history of several interesting species by means of his investigations.

It is not to the subject of mining Diptera, however, that I now seek to direct especial attention, but to another tribe of equal interest,—that of parasites; those flies, for instance, which pass the first and most important stage of their existence in eating the bodies of other insects, especially of Lepidoptera, whose larvæ they destroy, and thus perform a very useful work in Nature, though one not always appreciated by the collector.

The parasitic class of insects is a very large one, and a great part of it consists of Hymenoptera. I am glad to say that this division has lately received much attention, especially at the hands of Messrs. Fitch and Bridgman. The dipterous parasites, on the contrary, are very little known; and the family of the *Tachinidæ* is the most difficult one to study in the whole order of Diptera. A large number of these flies have been described and named, but very few have been traced to their origin. If lepidopterists would carefully preserve all that they breed from the pupæ of moths or butterflies, and note the species from which each one emerged, the life-history of this interesting family might soon be rescued from its present obscurity. I will gladly endeavour to name any specimens so bred, if they are forwarded to me.

With the exception of a list of European *Tachinidæ* and their feeders, arranged side by side, which was compiled by the late Francis Walker, and published in the 'Cistula Entomologica'

(pars X., September, 1874), no systematic attempts have, I believe, been made to arrange the different species of parasite, together with those of their victims; and at present the amount of information on the subject is too small to enable me to place them in any order. A good many facts have been recorded by R. Desvoidy, Macquart, Zetterstedt, Schiner, Rondani, and others; and I will endeavour to add my mite to the stock of information on the subject by recording those facts that have fallen under my own observation.

The parasitic Diptera do not all belong to the *Tachinidæ*, though this may be named the family of parasites "par excellence." Some of the little flies belonging to the genus *Phora* have been bred from the pupæ of other insects, but not much is known about them. Two instances of this kind have fallen under my own observation, *viz.*, in December, 1880, I received a specimen of *Phora minor*? Zett., from Mr. Fitch, which he had bred from the larva of a sawfly (*Nematus salicis*); and a few days since Mr. C. Waterhouse sent me one of *Phora rufipes*, Meig., bred from *Nematus ribesii*.

Some of the *Sarcophagæ*, or flesh flies, have been bred from the larvæ of other insects. I was much interested by receiving several specimens of *Sarcophaga lineata*, Fallen, in September last, from Sir Sidney Smith Saunders, which had been bred from the locusts (*E. cruciata*) in the Troad, and to which they were said to have been very destructive. A closely allied species (*S. affinis*, Fall.) has been reared from two or three species of *Tinea*. The larvæ of the flesh flies mostly live upon dead animal substances; and Schiner* thinks it doubtful whether they are ever true parasites, but only feed upon the larvæ or pupæ of insects which have died from other causes. Should this surmise be correct, will it not apply also to the larvæ of the *Phoræ*, which have been found in other larvæ?, for these little flies are mostly reared from decaying vegetable and animal (?) matters. In the United States Professor Riley found the larvæ of *Anthomyia angustifrons*, Meig., very destructive to the locust eggs, while *Tachina anonyma*, Riley, and *Sarcophaga sarraceniæ*, Riley, were parasitic on the locusts themselves.

Lastly, with respect to anomalous parasites, I may mention that Mr. Bridgman lately sent me three female specimens of the

* 'Fauna Austriaca' (Diptera), vol. i. p. 568.

common *Dilophus vulgaris* (*Bibionidæ*), together with their pupa-cases, which had been bred, as he informed me, by Mr. F. Norgate from larvæ of *Catoptria hypericana*. The *Dilophi* have always been supposed to be vegetable feeders, the larvæ eating the roots of grass, &c. They often swarm in great numbers in the autumn, and I need not say that this is not the habit of the parasitic flies, which though numerous as species are scarce as individuals. I think there must have been some mistake in the matter, but record the observation to stimulate further researches.

I will now conclude my remarks by giving a list of those Tachinids whose origin is known to me. It will be seen that some prey upon a number of different larvæ, while others appear always to attack the same species. I shall follow no arrangement, but commence with the most common parasite.

EXORISTA VULGARIS, Fallen.

I have received specimens of this fly from several correspondents, whom I will mention in alphabetical order, giving the names of the insects from which they were bred.

Mr. Bignell, of Stonehouse, sent me specimens bred from *Tæniocampa stabilis*, *Polia flavocincta*, *Notodonta camolina*, *Hybernia defoliaria*, *Vanessa urticæ*, *Tortrix ribeana*, *Abraxas grossulariata*, and *Eubolia cervinaria*.

Mr. Bridgman, from *Sphinx ligustri*.

Mr. Fitch, from *Simyra venosa*, *Phlogophora meticulosa*, and *Zygæna filipendulæ*.

Mr. Fletcher, of Worcester, from *Pieris rapæ* and *Abraxas grossulariata*.

Mr. Mosley, of Huddersfield, from *Odonestis potatoria* and *Anthocharis cardamines*.

Mr. Porritt, of Huddersfield, from *Odonestis potatoria*.

This ubiquitous parasite varies so much in size, colour, and even in structure, that several varieties have been made by R. Desvoidy and Macquart into distinct species; most of these are, doubtless, only varieties of one species, but I believe that two or three distinct ones have been confounded together, though I have not yet been able to separate them by any really distinctive characters.

EXORISTA GRANDIS, Zett.

This fine species has been bred from *Saturnia carpini* by Mr. Bignell, Mr. Fitch, Mr. Mosley and Mr. Sang.

EXORISTA HORTULANA, Meigen.

I have received this species from Mr. Bridgman and also from Mr. Porritt, by both of whom it was bred from *Acronycta alni*.

EXORISTA AFFINIS, Fallen.

Mr. Bridgman sent me specimens of this species bred, together with the last, from *Acronycta alni*; and I have also received it from Mr. Fitch, who reared it from a larva of the same species. It appeared such a remarkable circumstance that two distinct but closely-allied parasites should be bred at the same time from the same larvæ that I was led to examine them very carefully, and suspect that the flies which I have severally named *E. hortulana* and *E. affinis* are only varieties of the same species, which is probably new, as it does not exactly agree with the descriptions given of either of the above species.

EXORISTA LOTA, Meig.

Mr. Dale sent me specimens bred from *Taniocampa stabilis*; and Mr. Fletcher one from *Acronycta psi*.

EXORISTA PARENS, Rondani.

I have received this species from Mr. Bignell, bred from *Polia flavocincta*.

NEMOREA NOTABILIS, Meig.

Mr. B. Cooke gave me a specimen of this species, bred from *Botys verticalis*; and I have received another from Mr. Porritt, reared from the larva of the same species.

PHOROCERA CONCINNATA, Meig.

Mr. Fletcher has bred this fly from *Acronycta aceris*.

TACHINA LARVARUM, Linn.

This large parasite has been bred by Mr. Bignell from *Zygæna filipendulæ*.

BAUMHAUERIA VERTIGINOSA, Meig.

Mr. Fitch has bred this from the larva of *Chelonia caja*.

SCOPOLIA OCYPTERINA, Zett.

Mr. Butler sent me this species, reared from *Pterophorus tephradactylus*.

THELAIRA LEUCOZONA, Panzer.

This parasite—which is placed in the family of the *Dexiidae* instead of the *Tachinidae*, in consequence of its having a plumose arista—has been bred by Mr. Butler from *Chelonia caja*.

Bradford, Yorkshire, October, 26, 1881.

DIPTEROUS PLANT-MINERS IN THEIR PERFECT STATE.

BY PETER INCHEBALD, F.L.S.

IN a paper on the subject of plant-miners, which I communicated to this magazine last autumn (Entom. xiv. 41), I spoke of the *earlier* stages of these plant-mining Diptera,—their larva and pupa state,—together with their habits of life and phases of development. This year I have been fairly successful in rearing the imagines, and I gladly place my observations, such as they are, in the hands of those of your readers who may be interested in our mining Diptera. I must mention at the very outset that I have had the privilege of the diagnoses of Dr. Meade, of Bradford, in the identification of most of those species that I have happened to rear; diagnosis in species so closely allied is in many cases very difficult. My very best thanks are due to him, as are those of our dipterists generally, for the patience and perseverance he has shown in his discriminations. As in my previous paper I will give the various classes of plants, and the Diptera that affect them.

RANUNCULACEÆ.—*Ranunculus repens* yielded me, though scantily, *Phytomyza flava*, Fallen. It is a pretty little fly, and very lively in its movements. The pupa from which it emerged is shining bottle-green in colour. The imagines began to appear on the 10th of July. Dr. Meade remarks that *P. flava* was the name given to it by Fallen in 1823. Goureau and Desvoidy have since described it under the name *Ranunculi*, a better name, perhaps, if the insect should prove an exclusive feeder on *Ranunculus*. Fallen seems to have known nothing of the food-plant. The leaves of the columbine of our gardens showed extensive mining in the autumn of 1880. Sometimes two mines occupied one leaf. They pupated within the glass-topped box, the pupa being of a shining amber-colour. The imagines appeared in the spring of 1881, and proved to be the *Phytomyza anchole* of Goureau and Desvoidy, which is identical with the *Phytomyza obscurella* of Fallen. I bred fully a dozen of this fly in May of the present year.

UMBELLIFERÆ.—*Phytomyza albiceps*, the feeder on *Heracleum*, I find bestows his attentions on various *Compositæ*, as well as *Umbelliferæ*. I have bred this fly from ivy-leaved lettuce (*Lactuca*

muralis), as also from dandelion and nipplewort (*Lapsana*). It is probably, therefore, the most polyphagous of the group. This bears out the remarks of Scholtz and Hardy, who find the fly mining such various vegetation. Fully a dozen distinct plants afford food to *P. albiceps*, according to their observations. Another beautiful fly is *Trypeta onopordinis*, which mines our celery leaves, often damaging the crop, though not so seriously as to interfere with its growth. It was first described by Linnaeus, in his 'Fauna Suecica,' in 1771; he found it mining the leaves of *Heracleum*. It is now called *Acidia heraclei*, L. The affected celery leaves were gathered on the 17th of July, and the imagines emerged from pupahood on the 17th of August.

CRUCIFERÆ.—Though not a miner, but a root-feeder, I would draw attention to a fly, *Chortophila floccosa*, Macquart, which is destructive in the larva state to our young savoy. The plants that were affected died from the loss of their rootlets. I bred both male and female. The tufts of hairs on the posterior thighs serve to identify the species. Dr. Meade remarks that nothing of its life-history in connection with its food-plant has been previously recorded.

LABIATÆ.—I succeeded this year, for the first time, in rearing the gall-gnat of the ground-ivy. It is instrumental in forming those reddish purse-like galls on the leaf of the ground-ivy. I gathered the galls in the autumn of 1880, and the imago put in an appearance on the 28th of the May following. The structure of the gall itself is as marvellous as it is mysterious. The opening of the cone-shaped purse is on the under side of the leaf, and in this purse the larva lives, feeds, and pupates, putting on wings, as I have said, in the following May. The name of the gall-gnat is *Cecidomyia bursaria*, Bremi.

CHENOPODIACEÆ.—Here, again, we find probably the whole family mined by *Chortophila betæ*, Curtis, the pest of our mangold fields. I have bred the identical fly from Chenopod-spinach, mangold and beet this year, and this is possibly not surprising, as the juices and mucilage of the group would doubtless make it generally available for culinary purposes, like the spinach. I hear, indeed, of a sea-coast Chenopod (*Schoberia maritima*) furnishing food to *C. betæ* on the Sussex coast. Thus it is more than probable that the fly may adapt itself to circumstances in obedience to the season and its food-supply.

POLYGONACEÆ.—I have bred in tolerable abundance the miners of the sorrel and dock. From the sorrel, *Pegomyia nigratarsis*, Zett., and *Chortophila transversalis*, Zett. The former species, says Dr. Meade, has been confounded with *P. fulgens*, Meigen; but Rondani says they are distinct, the true *P. fulgens* having a yellow scutellum. It is somewhat doubtful whether the continental *P. fulgens* has been seen in Britain. From the dock (*Rumex obtusifolius*), *Pegomyia nigratarsis* of Zetterstedt, and *P. bicolor*, Wiedmann; very possibly, as Dr. Meade remarks, feeding within the same leaf. Robineau Desvoidy and Schiner both suspected the distinctness of the miners of the sorrel-dock. From the sorrel I bred largely; I had fifty pupæ, but all proved to belong to one species. I had ninety-six pupæ of the dock, and from these two species presented themselves.

AQUIFOLIACEÆ.—I had abundantly *Phytomyza aquifolii*, Walker, from blotched holly leaves. This insect—so common with us, as to blotch in some seasons nearly every leaf—is not mentioned by Schiner, Meigen, or Zetterstedt. I had a score at one time in my breeding box. It differs, says Dr. Meade, from *P. obscurella*, Fall., in the lower part of the face (untergesicht), being pale yellow. In *P. obscurella* it is dusky; moreover the venation of the wings is different.

COMPOSITÆ.—From the blotches of the burdock leaves I hatched, early in May, both male and female flies of *Chortophila conformis*, Fallen. Dr. Meade informs me that the male was previously unknown; and remarks further that it closely resembles the *C. rimans* of Rondani, according to the description which he gives of the female of that species, of which he did not know the male. Another Composite, the groundsel, yielded me, in fair abundance, the beautiful *Spilographa Zoë*, Meig., which Bremi bred also from groundsel. It is one of the *Trypetidæ*, whose lively, fanning, movements I so much admire. The larva of this fly feeds within the leaves of the groundsel, usually near the midrib. The pupa is pale yellow. I reared plenty, both of the male and female.

Fulwith Grange, Harrogate, October 24, 1881.

THE GENUS *PHÆDON*.

BY THE REV. W. W. FOWLER, M.A., F.L.S.

As there seems to be so much misunderstanding about the different species of the genus *Phædon*, it may perhaps be useful to say a few words concerning the group, especially as the subject has been lately discussed in the pages of the 'Entomologist.' Stephens places fourteen species in this genus, including in it our genera *Plagiodera*, *Prasocuris*, *Phratora*, *Phædon*, *Gastrophysa*, and one *Chrysomela*, viz. *fastuosa*. Of all these none, except *Plagiodera*, have any affinity to the *Phædons* proper. It might seem, indeed, at first sight, that *Plagiodera armoraciæ* was a real *Phædon*; it is, however, generally distinguished by the ventral segments of the abdomen, and by its much flatter and less convex appearance. It is decidedly a rare insect, and I have not heard of its being taken since Mr. G. C. Champion found it a few years ago. It is said to be found beneath the bark of willows, or at the roots of grass in marshy places; the latter habitat seems to agree better with the nature of the whole group, and very probably the willow bark only serves it as a refuge from weather, or as winter-quarters, as it is a very common thing to find allied species of the *Chrysomelidæ* under bark of trees in winter. We have, then, left, four species of *Phædon* proper, which may be treated of in order:—

Phædon tumidulum, Kirby.—This species, which has no synonyms, is easily distinguished by its thorax being distinctly punctured at the base only, the rest being smooth; it is of a dull dark blue or olive-green colour, and not very variable. It is exceedingly abundant in spring and summer on hedge-sides and ivy banks; in fact I have seldom swept any locality without coming across it somewhere or other. I never remember, though, to have found it on marshy, or even damp, ground.

Phædon betulæ.—Dr. Sharp, in his Catalogue, assigns this species to Linné, and gives the *P. betulæ* of Waterhouse's Catalogue as a synonym of *P. cochleariæ*; whereas in Waterhouse's Catalogue *Phædon armoraciæ*, Linné, *P. cochleariæ*, Fab., and *P. betulæ*, Suffr., are given as synonyms for one species; and *Phædon betulæ*, Linné, and *P. cochleariæ*, Suffr., are given as synonyms of another species. It is very probable that some

confusion has arisen at some time or other between *Plagiodera armoraciæ* and *Phædon armoraciæ*, which latter is plainly the insect that we are to understand by the *P. betulæ* of Dr. Sharp's Catalogue, as they are exceedingly alike at first sight, owing to their very prominent shoulders and general appearance. I think, then, that this *P. betulæ*, which stands next on our list to *P. tumidulum*, is Linné's *Chrysomela armoraciæ*, and not the insect he meant by *C. betulæ*. It is a very distinct species, and is easily distinguished from *P. tumidulum*, which it much resembles at first sight, by its thorax being distinctly punctured all over, and by its very prominent shoulders. I have always found it an uncommon insect, and have never taken it, or heard of its being taken, except in damp or marshy places.

Phædon cochleariæ.—This is usually considered to be the *Chrysomela cochleariæ* of Fabricius, although Mr. Waterhouse apparently considers Fabricius's insect to be synonymous with the preceding species. Thomson (Skand. Coleopt., viii. 273), assigns it to Fabricius, and his authority is of great weight. If Linné by his *C. betulæ* meant one of our *Phædons*, and not *Phratora vulgatissima* or some quite different insect, I am inclined to think that it is this species to which his name must be attached. This is the insect referred to in the 'Entomologist' for this present year by Mr. Hart (Entom. xiv. 187) and by Mr. Billups (Entom. xiv. 237). It is easily distinguished from the other species by the punctuation of its thorax, its less convex shape, and the peculiar brightness of its colour; it seems peculiar in that it appears to have no particular preference for either dry or marshy ground. Mr. Billups has shown how abundantly he has found it on a dry field; and I have taken it in company with the preceding species in a marshy place near Repton, and on cruciferous plants growing actually in the water near Lincoln. This species is perhaps the most injurious to man either of this or the allied genera, as it seems to attack useful plants to a greater degree than its congeners.

Phædon concinnum, Steph.—This species is distinguished from the preceding by its rather more convex shape, and by its being almost universally of a bright green colour, *P. cochleariæ* being nearly always blue; the interstices of the elytra in *P. concinnum* are coarsely punctured and wrinkled, whereas in *P. cochleariæ* they are only very finely wrinkled. I have not heard of this insect

having been lately taken in England; but Stephens mentions it as having been abundant at Southend; and this, as being a maritime locality, agrees perhaps with the locality from which I always receive it, *viz.*, the shores of the Solway Firth, near Dumfries. It seems never to be found away from the sea, and in general form and appearance is so like *P. cochleariæ* that it might be open to question whether it is not merely a race of this insect modified by a maritime life and different food. The first three species of *Phædon* (if we perhaps partially except *P. tumidulum*, which is found on many different plants) apparently feed on cruciferous plants of various kinds; it would, however, appear that *Phædon concinnum* cannot possibly obtain such food. I wrote to Mr. W. Lennon, of Dumfries, who has been most kind in supplying me with specimens of this species, and asked him if he could tell me anything about it, and I cannot do better than quote his letter:—"I am sorry," he says, "that I cannot say with certainty what really is the food-plant of *Phædon concinnum*. I find them all along the Solway for about ten miles, and I always find them on the fine, short, green pastoral grass, peculiar to the salt-marsh; in short there are no other plants about, except here and there patches of the sea-pink. As a rule, I never find them beyond the range of the salt water." Mr. Lennon goes on to say that although he has kept them alive with a sod of this grass for four months he has never noticed them feeding. The evidence as to its food-plant is therefore entirely negative.

A good deal more might perhaps be said on this group, but I hope that what has been said may help to simplify matters, and not make a confusion, which is as great as any I have ever come across in entomological nomenclature,—a "confusion worse confounded." I am quite aware that much I have said may be open to criticism, and shall be only too glad if any one else will throw a little more light upon the subject.

Lincoln, November 16, 1881.

ENTOMOLOGICAL NOTES, CAPTURES, &c.

COLIAS EDUSA AT MALDON.—On September 26th I caught a fresh female *Colias Edusa*, which was flying very weakly about 3 o'clock in the afternoon, a few minutes only after a very heavy

storm. I kept it alive until October 4th, but it proved infertile. This is only the second specimen I have seen since December, 1877; the other was a worn female, found on exactly the same date as this in 1879.—EDWARD A. FITCH.

COLIAS HYALE.—Not having seen any record in the 'Entomologist' of the capture of the above species this season, I thought perhaps I should be pardoned sending you the information that I took a fresh specimen while staying at Deal in August last, on one of the slopes at Kingsdown, on the morning of the 18th of that month. This was the only one that I saw. I did not see *Colias Edusa* during the time that I was there, neither did I hear from other entomologists of it having been seen.—J. R. WELLMAN; 319, Elm Park, Brixton Rise, S.W., October 25, 1881.

ON THE SUPPOSED EXTINCTION OF *VANESSA C-ALBUM*.—Allow me to say a few words in reply to an article under the above title by Mrs. E. S. Hutchinson, which appeared in the November 'Entomologist' (Entom. xiv. 250). The text taken is a statement of mine (Entom. xiv. 210), which runs as follows: "*Vanessa C-album* is undoubtedly becoming scarcer in Great Britain, and is perhaps on the road to utter extinction." Now at the outset, as the above title shows, your correspondent has signally failed to comprehend the meaning of my statement. I never said, or supposed, that *V. C-album* had become extinct; what I did say was, "that it is becoming scarcer, and perhaps will become extinct." The writer should have written, "On the *probable* extinction of *V. C-album*," and would then have been strictly accurate. Mrs. Hutchinson then goes on to tell of the extraordinary abundance this year of the insect; and what I want to point out is that, by her own showing, this abundance is extraordinary and not normal, and is probably to be classed with those periodical seasons of abundance which more or less affect most species. The lady then warns us not to expect many *V. C-album* next year, and in this I think her correct. It is well known that from numbers of former localities the insect has now entirely disappeared, and I think I may safely say that an equivalent number of new ones has not been discovered. It is from these considerations that the observation that "*Vanessa C-album* is undoubtedly becoming scarcer in Great Britain, and is perhaps on

the road to utter extinction," seems to me of the nature of a self-evident proposition. The very fact of Mrs. Hutchinson's failure to introduce it into other, and presumably appropriate, districts, is of itself significant to the evolutionist. I think had *V. urticæ* been tried the result would have been different. Mrs. Hutchinson then utters a protest against confusing that which has never been confused, enquires into the extent of my familiarity with the earlier stages of *V. C-album*, compares those stages with the corresponding ones in *V. Polychloros* and *V. urticæ*, and asks—"How can anyone seriously propose that these three spring from one stock?" In reply let me say this is not the place for a general discussion of the theory of evolution, and refer Mrs. Hutchinson to the works of Darwin, Fritz Müller, and others, where perhaps she will find the question answered to her satisfaction. If Mrs. Hutchinson will look up Stainton's 'Manual' she will see the genus *Grapta* characterised by the "indentations of the wings," and not by the larva. My series of *V. C-album* is none too long; I will therefore with pleasure avail myself of Mrs. Hutchinson's liberality.—G. COVERDALE; 2, Cannon Street, City, November 5, 1881.

PROBABLE EXTERMINATION OF HESPERIA ACTÆON AT LULWORTH.—Referring to the note by Mr. M'Rae, of Bournemouth, on this subject (Entom. xiv. 252), let me say that, whilst staying at Bournemouth this summer, I determined to visit Lulworth in search of *H. Actæon*, even if I had to make a long tramp from the nearest railway-station, but I was much delighted to see there was a boat-excursion every Friday to Lulworth and Weymouth. Consequently August 5th saw me "*en route*." I had the pleasure, during the four hours' stay, of taking one dozen specimens, but was informed that the species was much more plentiful the week before. During the day I met several collectors, who, like myself, had come for the first time to Lulworth, and not one had taken more than twenty specimens; whilst, on meeting Mr. M'Rae, he showed me about fifty specimens in his box. Now I think the answer to the above query is to some extent found in the fact that residents near a special locality like Lulworth, perhaps unwittingly, do considerable damage, even more than occasional "trippers," as mentioned by Mr. M'Rae. In consequence of the great demand on them for local species, collectors who reside near such a locality year after year visit the same place, and advertise the

species for exchange, so contributing to this probable extermination.—ARTHUR J. ROSE; Mutlah Lodge, College Avenue, Hackney, November 4, 1881.

SPHINX CONVULVULI AT NORWICH.—On September 22nd I captured a specimen of *Sphinx convolvuli* at rest on the rails of the Wellington statue in the market-place, evidently attracted by the electric light. On the same afternoon Mr. P. E. Dyball took one from the electric lamp. On September 24th another was picked up on the ground under the electric light, and given to Mr. Dyball. On September 30th a friend of Mr. Dyball's, named Dodd, captured one on the back river.—H. J. THOULESS; Lower Close, Norwich, October 5, 1881.

ENNOMOS AUTUMNARIA.—After the announcement from M. Wailly of his having sent out a great number of foreign eggs of *Ennomos autumnaria*, all interested in pure British Entomology should endeavour to carefully examine, and, if possible, guard against introducing any doubtful specimens into their cabinets; and as my name is connected with the Deal examples, I should like to place on record faithfully all I know about them. From 1877 I have each year spent a month or five weeks entomologising at Deal. In the autumn of 1878, after having several times met Mr. R. Harbour collecting on the sand-hills, I went to look at his collection. In it I found he had several very good species that he had mixed up with other species, for although an ardent worker he was not well up in obscure forms. Amongst his "thorns," under *Ennomos angularia*, was a female *E. autumnaria*, worn, tips of wing broken, but still unmistakably *autumnaria*. He had also two or three male specimens, more or less imperfect, that struck me as different to our London type of *angularia*; still I was not convinced that they were anything else than strongly-marked *angularia*. The female I then and there placed for him under its proper name, and advised him to keep a sharp look out on the gas-lamps for more; this was in 1878. Two years after, in July, 1880, Mr. Harbour showed me his breeding-cage, in which at the time were one or two imagines of *E. tiliaria* just out of pupa, some spun-up pupa, and also two, or possibly more, long *Ennomos* larvæ. Not knowing them, I asked what they were. He told me they were *E. angularia*. As I had never bred that species I was desirous of doing so, to get varieties of this variable species; so asked him if he bred these and got eggs to

spare to send me some. This, some three months later, he did in October, 1879, sending me thirty-six eggs, saying, "Enclosed you will find a few eggs of *angularia*;" and as such I entered them in my note-book. These eggs hatched during April and May of the present year, and, as previously reported, to my great pleasure and surprise they proved to be *E. autumnaria*. I had no suspicion that they were other than they had been represented, and left them in charge of my son whilst I was away at Deal. Had I thought them so valuable a thing as they ultimately proved, I should most certainly have had them under my own care, as larva-feeding is distasteful to my son, and he takes no interest in them. When I left home on June 27th, looking at them as *angularia*, I thought the largest of them were full-fed. I was much surprised at my son's report for next fortnight that none had yet pupated, but that they were still feeding and growing. I must say this roused my suspicion that they must be some other species, and I mentioned to Mr. Harbour that I could not understand them. The mystery was cleared up on my reaching home on July 26th, when I found the first male out. Some of the larvæ were then feeding, and continued to do so until August 12th. My first work was to write Mr. Harbour, telling him of the mistake he had made in the species. Naturally he is vexed with himself thus to have passed over this rarity, still he is now fully alive to the nature of a species he has for years passed over as the common *angularia*. I have had the pleasure of sending him a fine batch of fertile eggs, with which, and his more recent captures, he should be able to supply every cabinet in England with, I believe, genuine British *Ennomos autumnaria*. It is clear Mr. Harbour has for some years past been taking *E. autumnaria* sparingly at Deal, under the impression that they were only *E. angularia*, although it is curious that he could possibly have passed over so striking a species, even after having bred it from the eggs of a female taken at a gas-lamp in the autumn of 1879. For myself I may state that I neither saw the parent moth nor their offspring, until I bred them this year. That I did not recognise the larva when I saw it feeding at Mr. Harbour's is easily understood. I have never seen it before, and certainly it did not agree with the only description I knew, *viz.* Newman's. Mr. Harbour's captures, dating back so long, cannot be affected by M. Wailly's eggs.—W. H. TUGWELL; Greenwich.

EUPITHECIA ULTIMARIA, Dup.—The history of this species is as follows:—It was captured near here by Mr. S. Stevens some twenty or twenty-five years ago, in the middle of September, and specimens forwarded to Guenée by Mr. Doubleday were returned to him as the *Eupithecia ultimaria* of Duponchel, with a query attached. Since then nothing has been done to establish its identity; and Mr. Stevens, I believe, has not taken it since. Mr. Bond has specimens taken on the downs in the Isle of Wight many years since. In the locality where the specimens were taken there are, within a radius of half a mile, some five or six stunted junipers, and I diligently worked these during the spring months, beginning in April, for *E. sobrinata* without success. I have also wasted two evenings watching these bushes, both at sunset, dusk and by lanterns, whilst these pugs were out, but have not seen a single specimen of *E. sobrinata* there. We do not at present know more of its life-history, though I fancy it will turn out a *Pimpinella* feeder. I have seen one or two specimens in other collections mixed with *Eupithecia sobrinata* or *E. subumbata*.—SYDNEY WEBB; 3, Luther Terrace, Dover. (See p. 303.)

DASYCAMPA RUBIGINEA.—This species was taken by me on the 15th inst. I found it enjoying itself on the ivy-bloom in my garden, in company with *Phlogophora meticulosa*, *Plusia gamma*, &c. It may also be interesting to the readers of the 'Entomologist' that I obtained a fine specimen of *Acherontia Atropos*, which had found its way into a cottage near here on the 23rd of September. In reply to "Notes from Bournemouth," *Xylophasia polyodon* and *P. meticulosa* have been very abundant, and *P. gamma* considerably less in number, in this neighbourhood.—S. NORMAN; Dartmouth Castle, South Devon, November, 1881.

VESPA NORVEGICA=*BRITANNICA* IN SUSSEX.—On August 27th I found a nest of the tree wasp (*Vespa britannica*) hanging on a fir tree (*Cedrus deodara*). It is about the size of an ostrich egg, and was hanging about five feet from the ground. Is not this species of very rare occurrence in this part of England?—THOMAS HOWE; Normanhurst Court, Battle, September 18, 1881.

["This species is rare in the South and West of England; it is not uncommon in Yorkshire, and is frequently found building in gardens in gooseberry bushes; it also builds in fir trees. In Scotland it is abundant; I have also received it several times from

Ireland. Examples which I have seen from Northern Europe are much more highly coloured than British specimens." (Smith's Cat. Brit. Foss. Hym., 1858, p. 221.) For economy, see 'Zoologist,' x. 3699; 1852. In Dr. E. L. Ormerod's 'British Social Wasps' we read that this wasp is very local; but that in Gloucestershire, whence Dr. Ormerod wrote, this was the most common species of tree-wasp: "In the hot summer of 1864, when wasps were everywhere, *V. britannica* built freely in the neighbourhood of Brighton, to the astonishment of the natives of these parts" (p. 217). For figures of its nest see plates v.(?), xi., xiii. and xiv. Mr. Bridgman records it but once from Norfolk,—a nest taken at Witton, in 1875, by the Rev. J. L. Brown (Trans. Norf. and Norwich Nat. Soc. ii. 627); and the name does not occur in the 'Natural History of Hastings, St. Leonards, and the Vicinity'; 1878. Mr. Howe's specimens are particularly dark.—E. A. F.]

OBITUARY.

JOHN BICKERTON BLACKBURN.—Mr. J. B. Blackburn was born in 1845; the son of Mr. Samuel Blackburn, a Liverpool merchant. He passed his boyhood in Cheshire, where, in conjunction with his brother the Rev. Thomas Blackburn and the Rev. Martin Geldart, he edited the 'Weekly Entomologist,' which for a time succeeded the 'Intelligencer,' and occupied its place until 1864, when the 'Entomologist' was again published in independence of the 'Zoologist.' Its contemporary, the 'Entomologist's Monthly Magazine,' also appeared about the same time. Soon after that period Mr. J. B. Blackburn came up to London, and entered the Civil Service, in the Secretary's office of the Inland Revenue, from which he was obliged to retire from ill health about four years ago. During the long holidays enjoyed by Civil servants he devoted his time chiefly to collecting Lepidoptera, and made many visits to Rannoch. It was there, on August 14th, 1867, when with the Rev. Chas. J. Buckmaster, he made the remarkable capture of three specimens of *Sterrhya sacraria*. A few years ago he matriculated at the London University, and eventually took the degree of B.A. Over-work at this period probably brought on the cerebral disorder which at last proved fatal. After spending

another spring and summer again in Scotland he partially recovered, and began to read for Holy Orders; but his recovery was only partial, and prevented the realisation of his hopes. Mr. J. B. Blackburn's name was well known to entomologists over a long period as an earnest collector of insects, and as one who with ever-ready kindness of heart made many friends. Amongst his best captures was a *Phycis* taken near Freshwater, while again in the company of Mr. Buckmaster. This was afterwards added to our fauna as *Phycis oblitella* of Zeller. After much suffering he died on October 29th last, at the house of his father-in-law, the Rev. John Buckmaster, vicar of Wandsworth, much lamented by the many friends who knew him as a bright and pleasant companion, before he was affected by the insidious disease which ended in his death.—J. T. C.

WILLIAM GARNEYS.—Although a name less well known than that of Mr. Blackburn, we have equally to lament the death of Mr. Garneys, which occurred on the 21st of October last. His loss is peculiarly felt in the Midland Counties, where he was well known for his good general knowledge of Natural History, and his ever-ready willingness to impart his knowledge to others with that geneality and kindness which characterised his whole life. His attention was given especially to Botany, Conchology, and Entomology, the order Coleoptera receiving his chief care. A few months before his decease he edited a new edition of the 'Fauna and Flora of Repton,' contributing a list of Coleoptera found between the rivers Dove and Derwent. Mr. Garneys, descended from a very old Suffolk family, was born at Bungay in 1831; he adopted the medical profession. His father, also a medical man, is still living, and it was from him his son inherited the taste for Natural History, fostered in his youth by intercourse with the Norwich naturalists of that time. About twenty years ago he joined the late Mr. Chas. Newgill, of Repton, in medical practice, who also was in his day well known as a botanist and entomologist. Notwithstanding a large country practice and the medical care of an important public school, Mr. Garneys always found time for his favourite study, even to the day of his death, which was caused by apoplexy. He leaves a widow and six children to mourn with his many friends the loss of a good friend, and quiet, but earnest, worker in Science.—J. T. C.

DESCRIPTION OF PLATE.

By JOHN T. CARRINGTON, F.L.S.

THE plate now presented to the readers of the 'Entomologist' is intended to represent only those species and certain varieties of Lepidoptera which have been recently captured in Great Britain. The following is a description of the twenty-two examples figured. The first seven are those of the genus *Eupithecia* :—

FIG 1. Was captured in the Hebrides with three others of the same form, during the past summer, by Mr. Meek's collector. A description of this and the two following will be given in an early number of the 'Entomologist,' as the specimens have gone to the Continent for comparison with nearly allied European species.

FIGS. 2 & 3. Were taken by Mr. H. M'Arthur in the Shetland Isles. They may be melanic varieties of *E. satyrata* or *E. nanata*. These, as in figure 1, will receive future consideration.

FIGS. 4 & 5. *Eupithecia jasioniata*, Crewe. Fig. 4 from larvæ found in North Devon, as recorded, Entom. xiv. 198, by Mr. R. Ficklin. Fig. 5 was bred from larvæ taken near Valentia, Ireland (Entom. xiv. 212).

FIGS. 6 & 7. If not new to science are the *Eupithecia ultimaria* of Dup. On page 300 in this number will be found some notes from Mr. Sydney Webb, who took on the Kentish Downs the examples figured.

FIGS. 8 & 9. Male and female (enlarged) of *Scoparia conspiciualis*, Hodgk., taken in North Lancashire (Entom. xiv., 223), by Mr. Hodgkinson.

FIG. 10. *Catoptria decolorana*, Frr. (enlarged). This species, which feeds upon the seeds of golden-rod (*Solidago virgaurea*) in dry woods, was known as *C. æmulana* until assigned its correct name (Entom. xii. 130). Though closely allied to *C. æmulana*, it may be easily recognised by its smaller size, shorter wings, and the more "powdery" appearance of the colours.

FIG. 11. *Catoptria æmulana*, Schl.=*modestana*, H.-S.=*tripoliana*, Barrett. Has also long been known as frequenting salt-marshes in this country, where it feeds in the seed heads of *Aster tripolium*. This species was recently redescribed by its latter synonym (E. M. M. xvii. 84).

FIGS. 12, 13, 14. *Boarmia repandata*, two extreme forms. Figs. 12 and 13 are of *B. repandata* var. *Sodorensium*, Weir, as described Entom. xiv. p. 220, from the Hebrides; while the other (fig. 14) is a very striking example of the var. *conversaria*, Hub., of the same species, taken by Mr. South in North Devon during the past season.

FIG. 15. A *Dicrorampha* (enlarged), as yet undescribed, also taken by Mr. South in North Devon.

FIG. 16. *Stigmonota scopariana*, H.-S. (enlarged). Added to the British fauna by Mr. Hodgkinson last season (Entom. xiii. 162).

FIG. 17. *Emmelesia albulata*, var. *Hebudium*, Weir (Entom. xiv. 221), from the Hebrides last season.

FIG. 18. *Bryophila par.*—Added last season to the British list by Mr. Wm. Warren (Entom. xiii. 225).

FIG. 19. A new British *Pterophorus*, probably *P. nemoralis* of Zeller. Also captured in North Devon by Mr. South.

FIG. 20. A very beautiful variety of *Melanippe montanata*, taken this summer by the Rev. H. T. Hutchinson, near Longleet, Wilts.

FIG. 21. *Pyralis Lienigialis*, Zell.—Added to our fauna by Mr. Thompson (Entom. xiv. 84), taken near Stony Stratford.

FIG. 22. *Tortrix Lafauriana*, Ragonot. Captured near King's Lynn, and added to the British list by Mr. E. A. Atmore, in July, 1881. (Entom. xiv. 153.)

We have to thank the various gentlemen by whom the specimens figured have been kindly lent.





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